# 1 PGFplots graph samples

## 1.1 from https://tex.stackexchange.com/questions/9386/difference-between-right-of-and-right-of-in-pgf-tikz website.

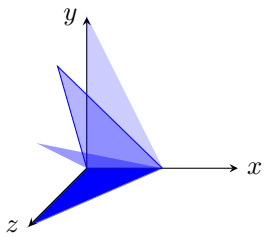
centre-to-centre placing while using `right of=` option in tikz

loooooooooooooooooooooooooooooooooong **node b**

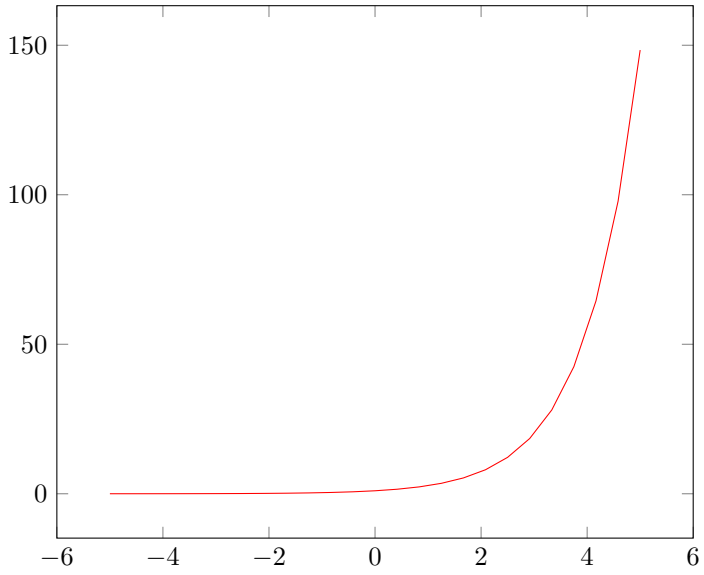
boundary-to-boundary placing while using `right=of` option in tikz

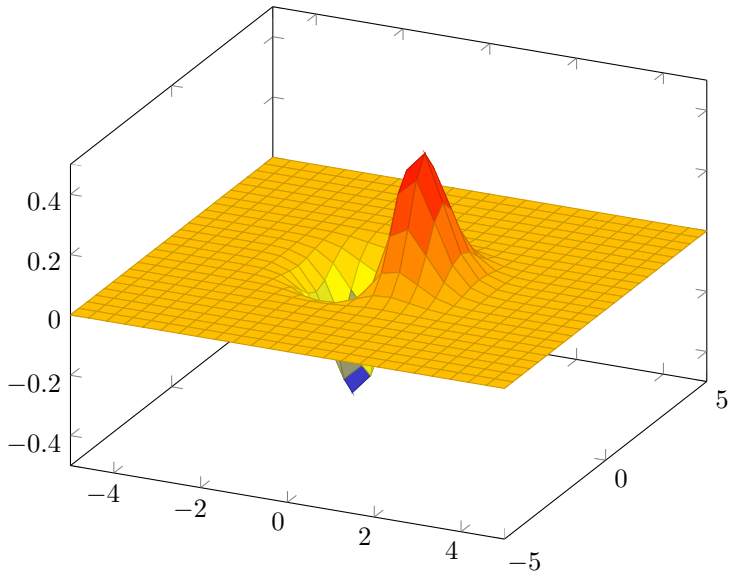
loooooooooooooooooooooooooooooooooong **node b**

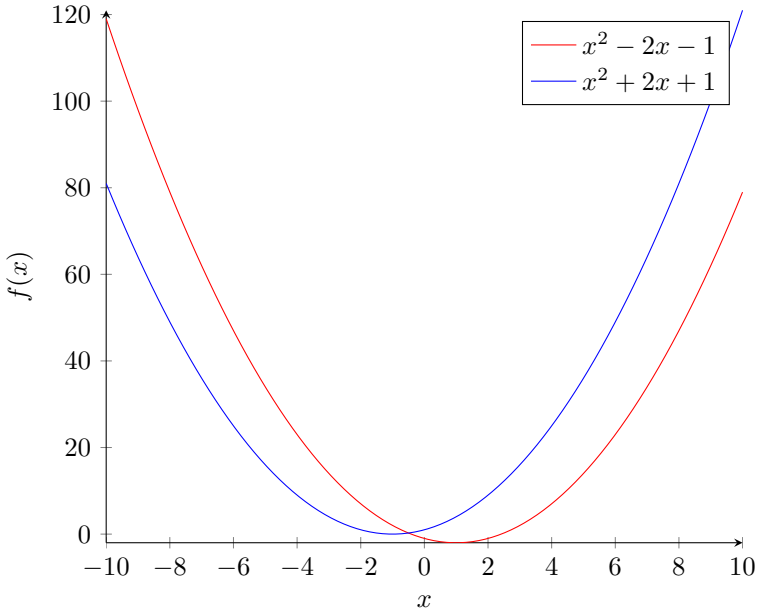
## 1.2 from https://tex.stackexchange.com/questions/354401/how-to-draw-a-vector-diagram-with-tikz-datavisualization



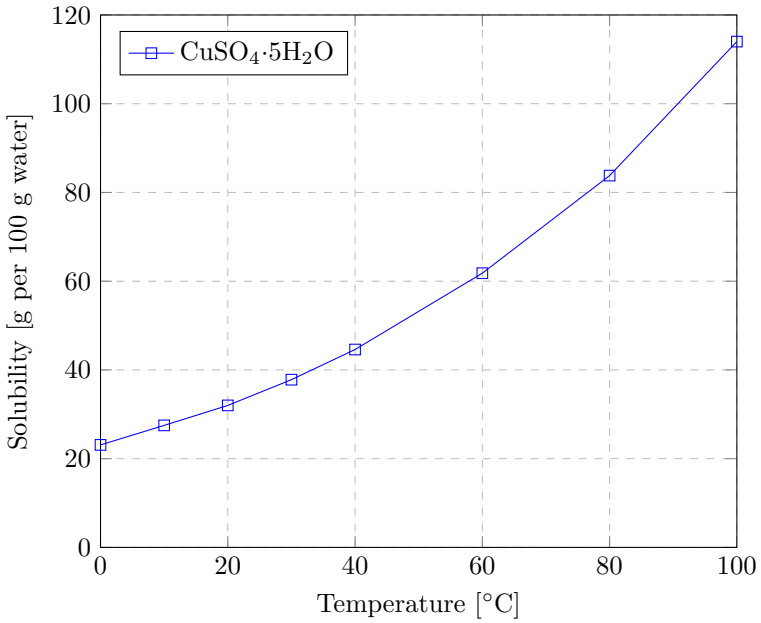

## 1.3 from https://www.overleaf.com/learn/latex/Pgfplots_package



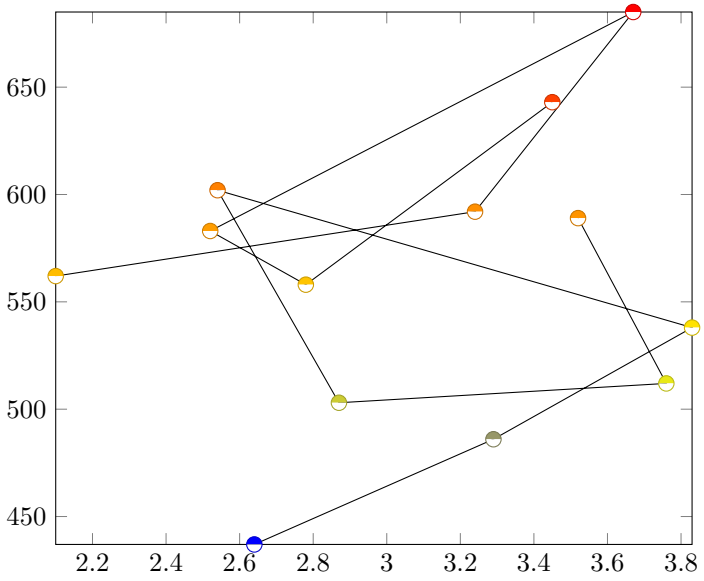

0.4
0.2
0
−0.2
−0.4
−4
−2
0
2
4
−5
0
5

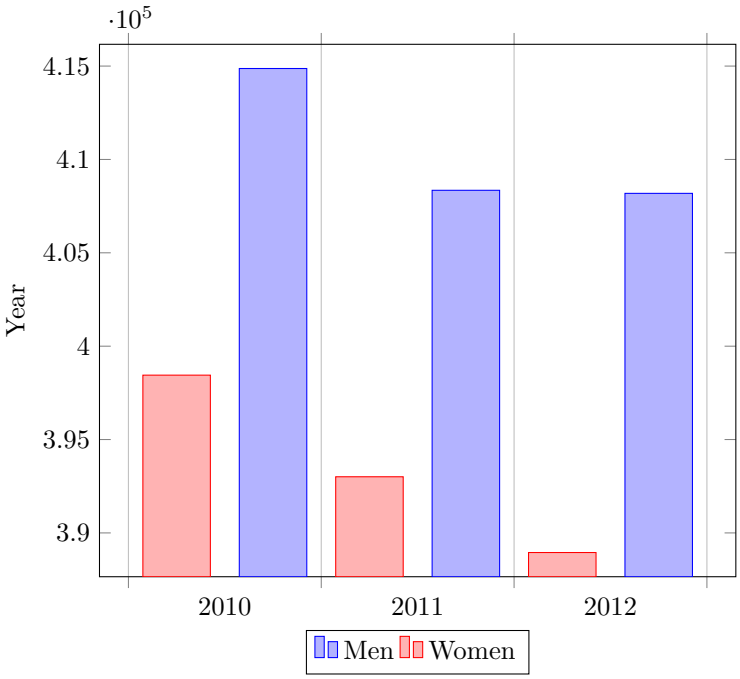

$x^2 - 2x - 1$
$x^2 + 2x + 1$
120
100
80
60
40
20
0
$f(x)$
−10
−8
−6
−4
−2
0
2
4
6
8
10
$x$

Temperature dependence of $CuSO_4 \cdot 5H_2O$ solubility

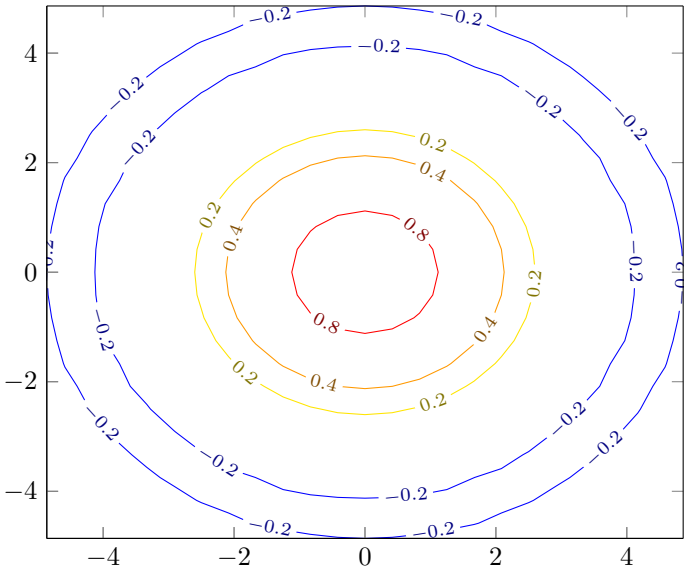


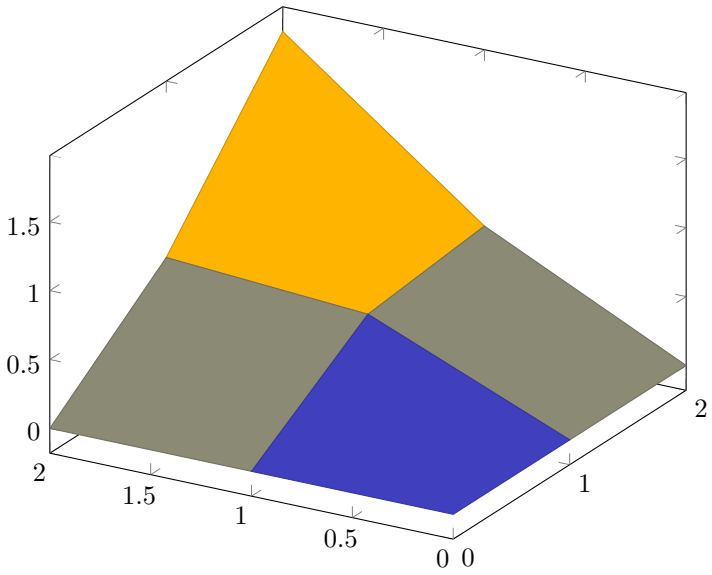

Empty line in file causes graph break

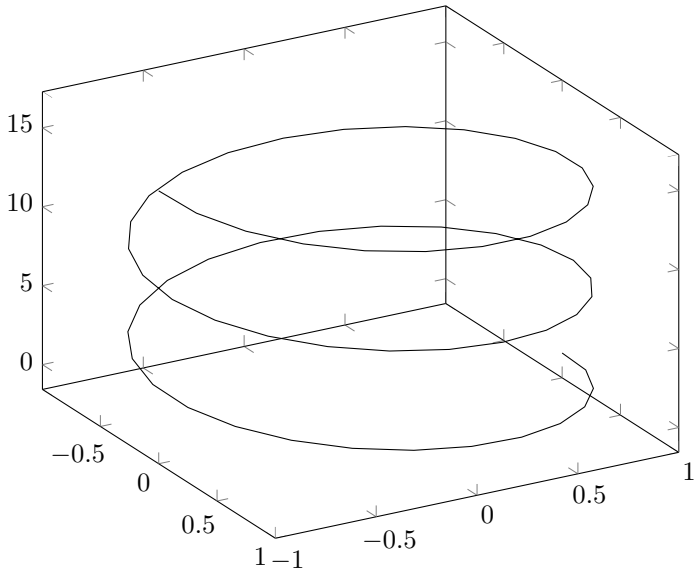





Contour plot, view from top




1.5
1
0.5
0
2
1.5
1
0.5
0 0
1
2


15
10
5
0
−0.5
0
0.5
1 −1
−0.5
0
0.5
1

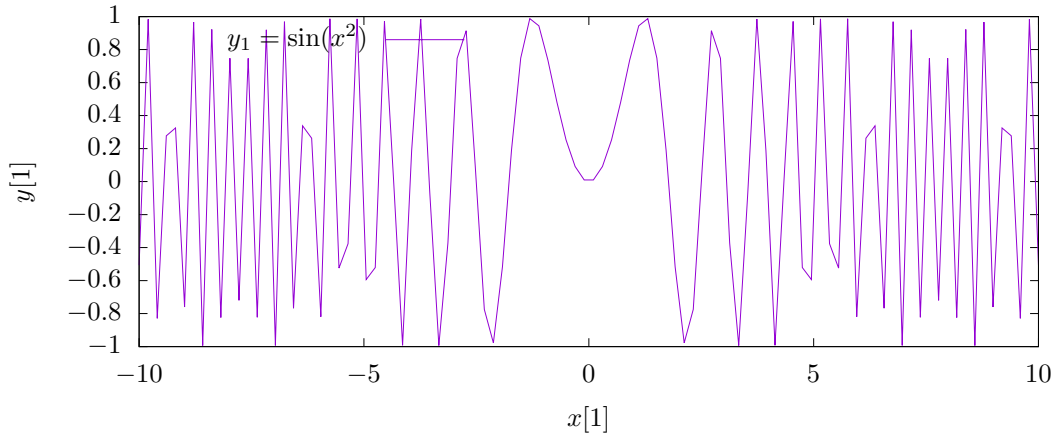
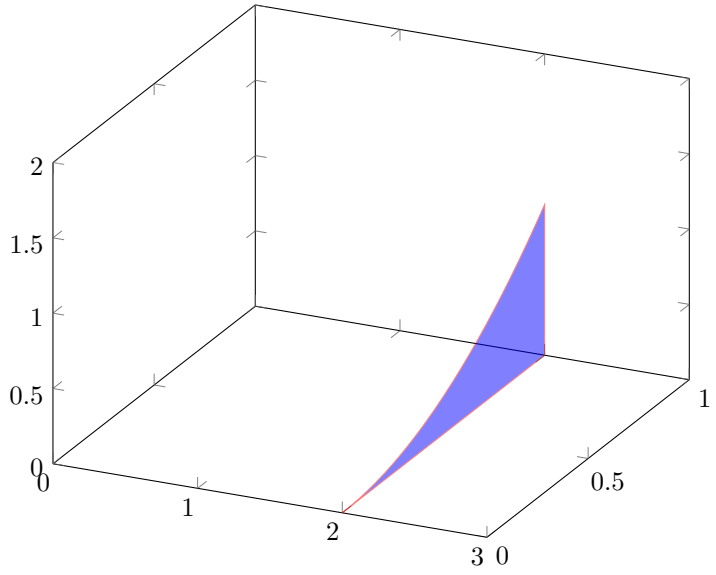


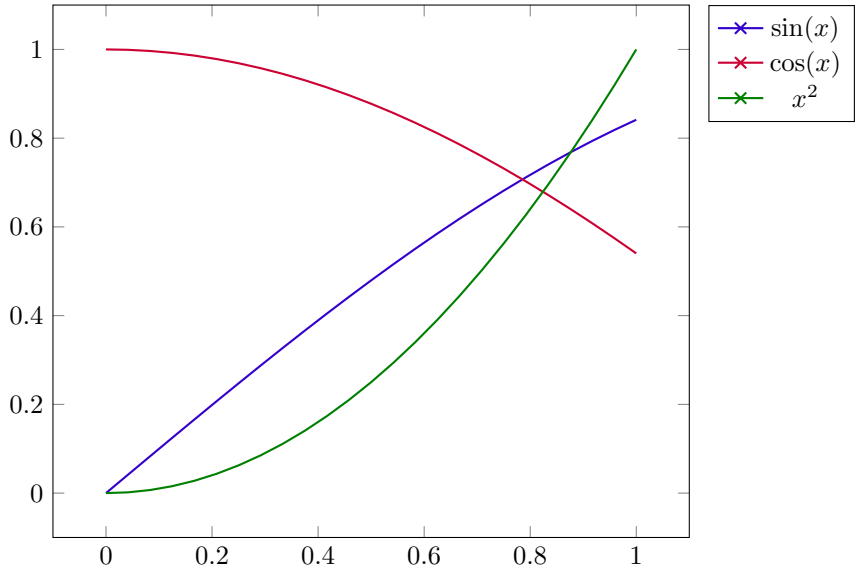

Figure 1: Plot

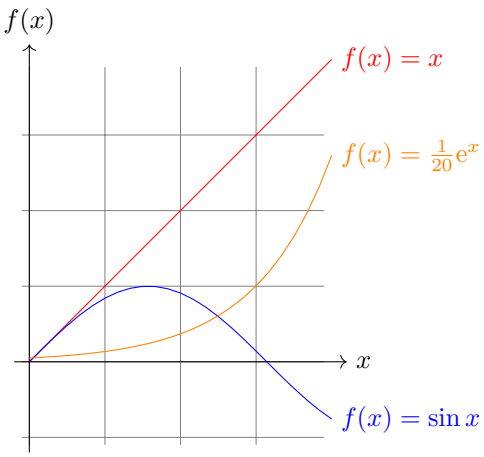
### 1.4 from https://stackoverflow.com/questions/36386656/how-to-plot-in-latex-with-gnuplot

### 1.5 from https://tex.stackexchange.com/questions/136288/pgfplots-how-to-fill-area-under-a-curve-in-a-3d-plot-similar-to-closedcycle-in

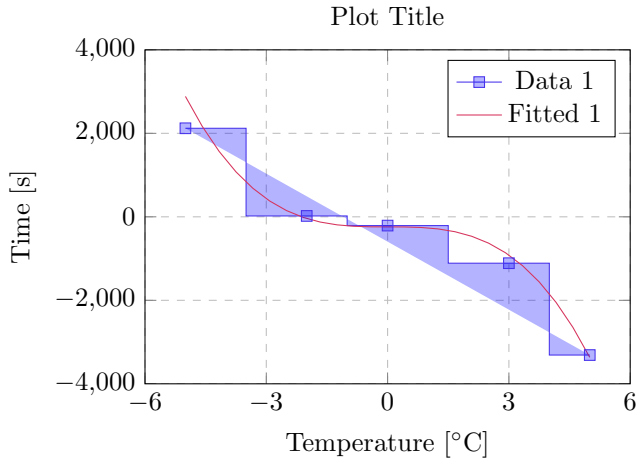


### 1.6 from https://tex.stackexchange.com/questions/16232/how-to-plot-fx-sinx-kx-cosx-and-ux-x%C2%B2-with-tikz

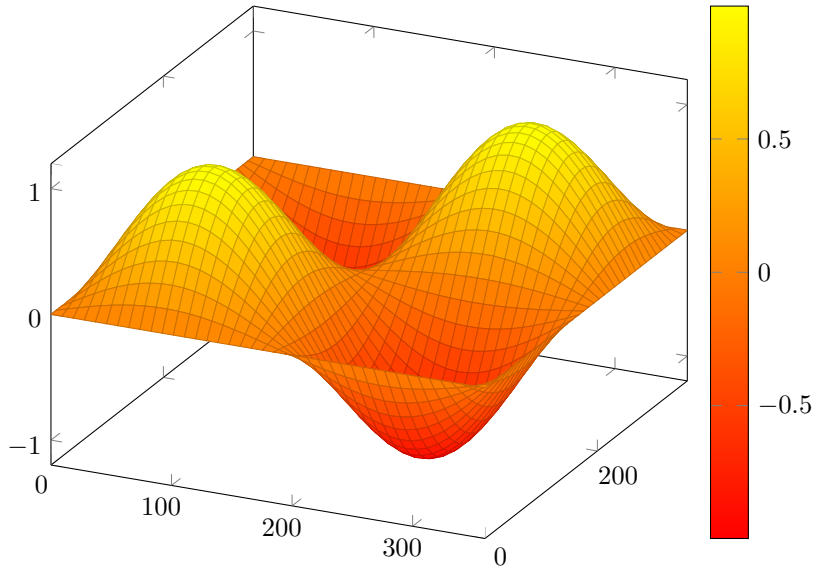


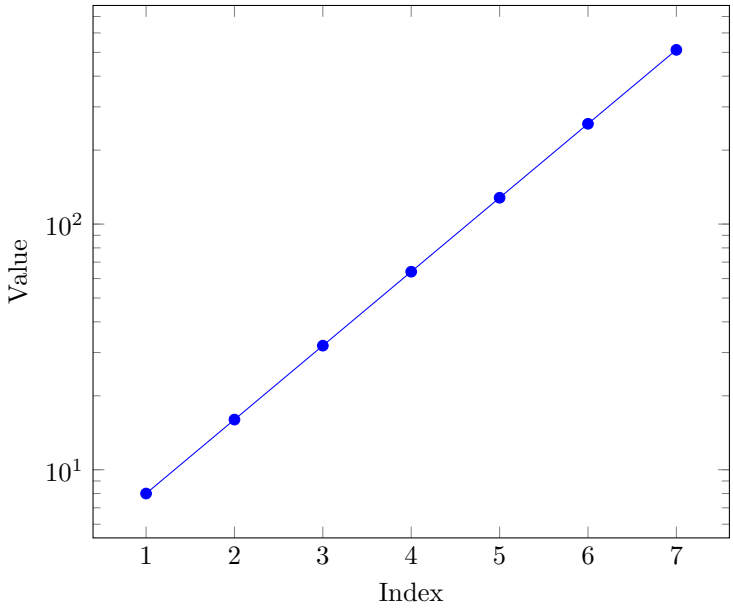




### 1.7 from

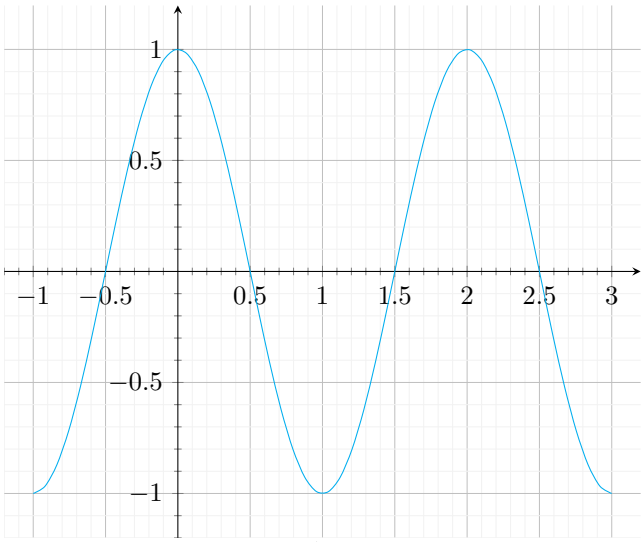


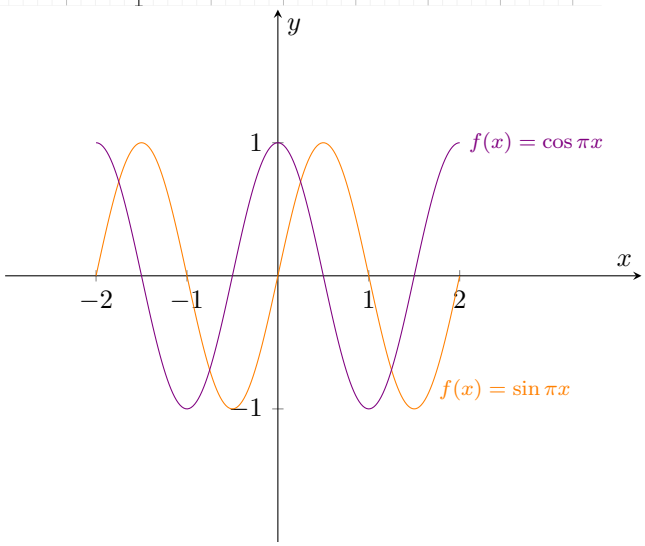
### 1.8 from



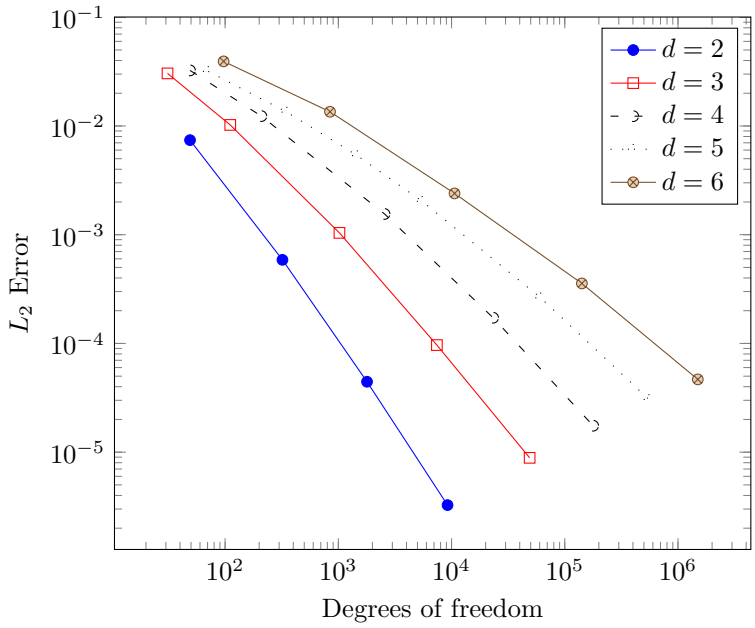



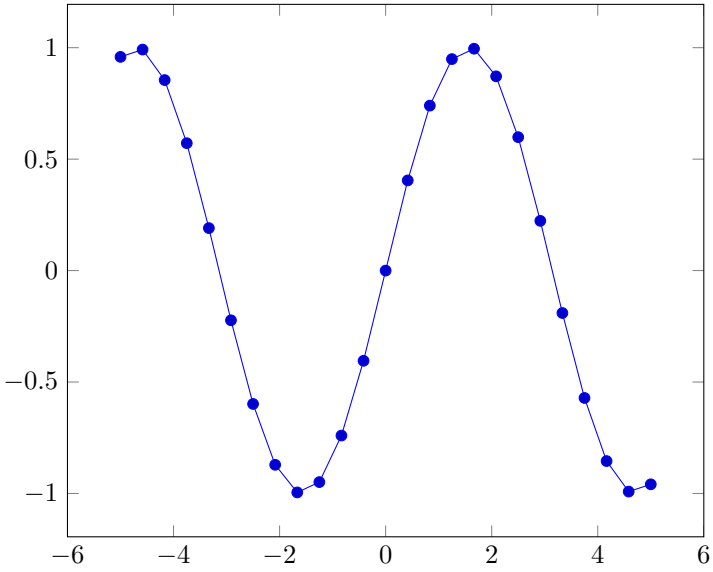
## 1.9 from https://tex.stackexchange.com/questions/361915/tikz-or-pgfplots-plotting-a-trigonometric-function-cos-sin-tan

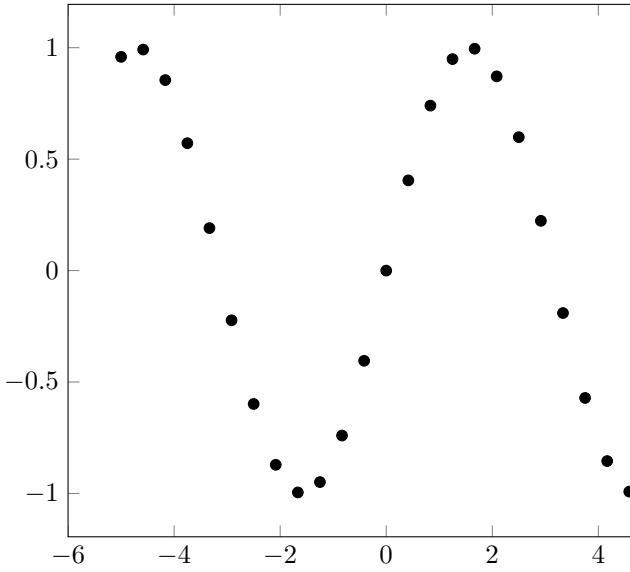


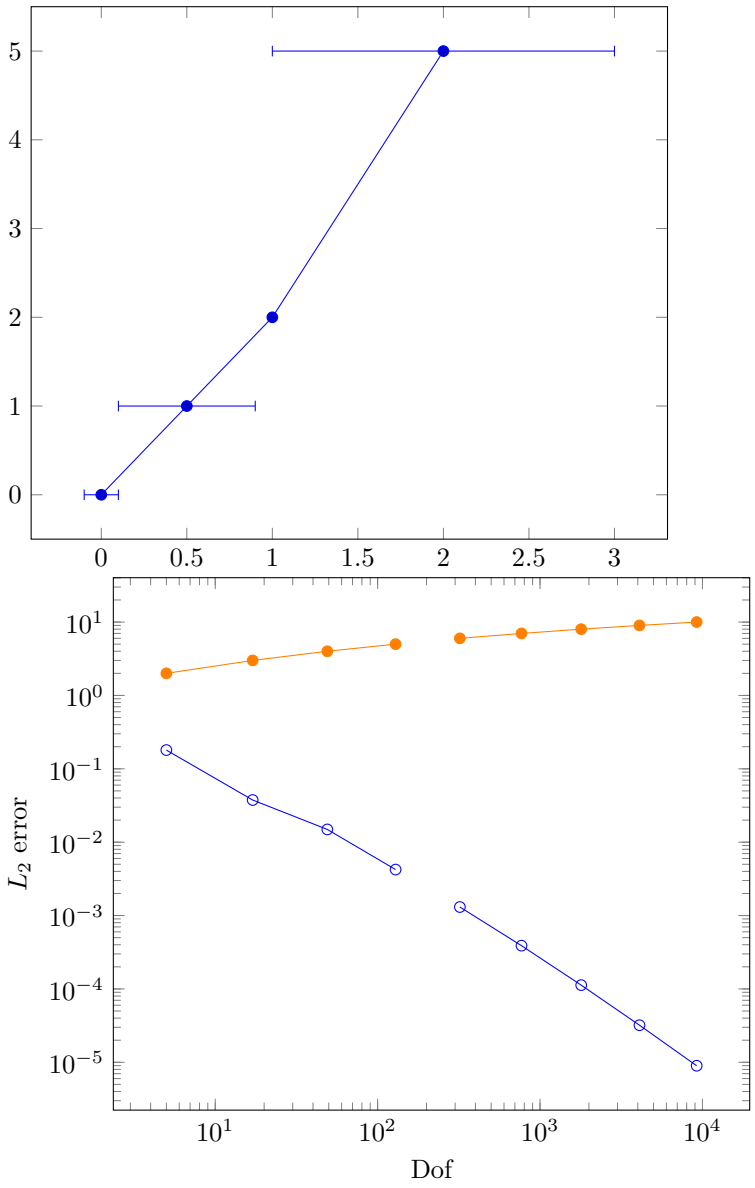



## 1.10 Line Plots

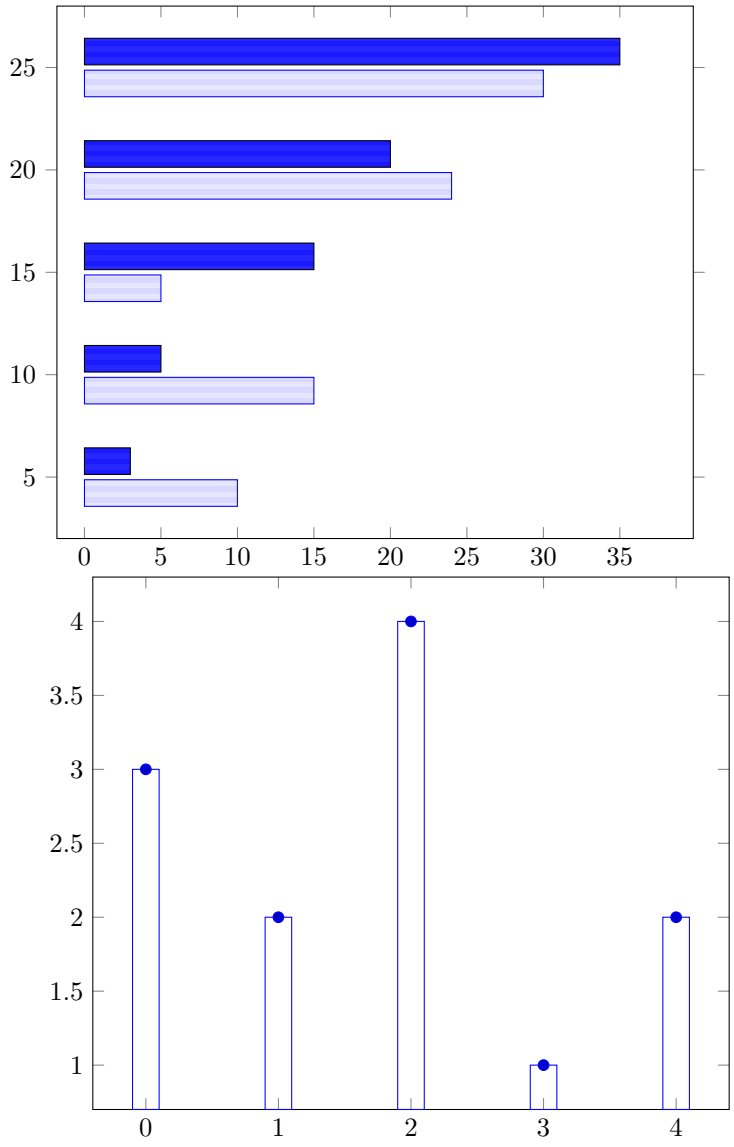


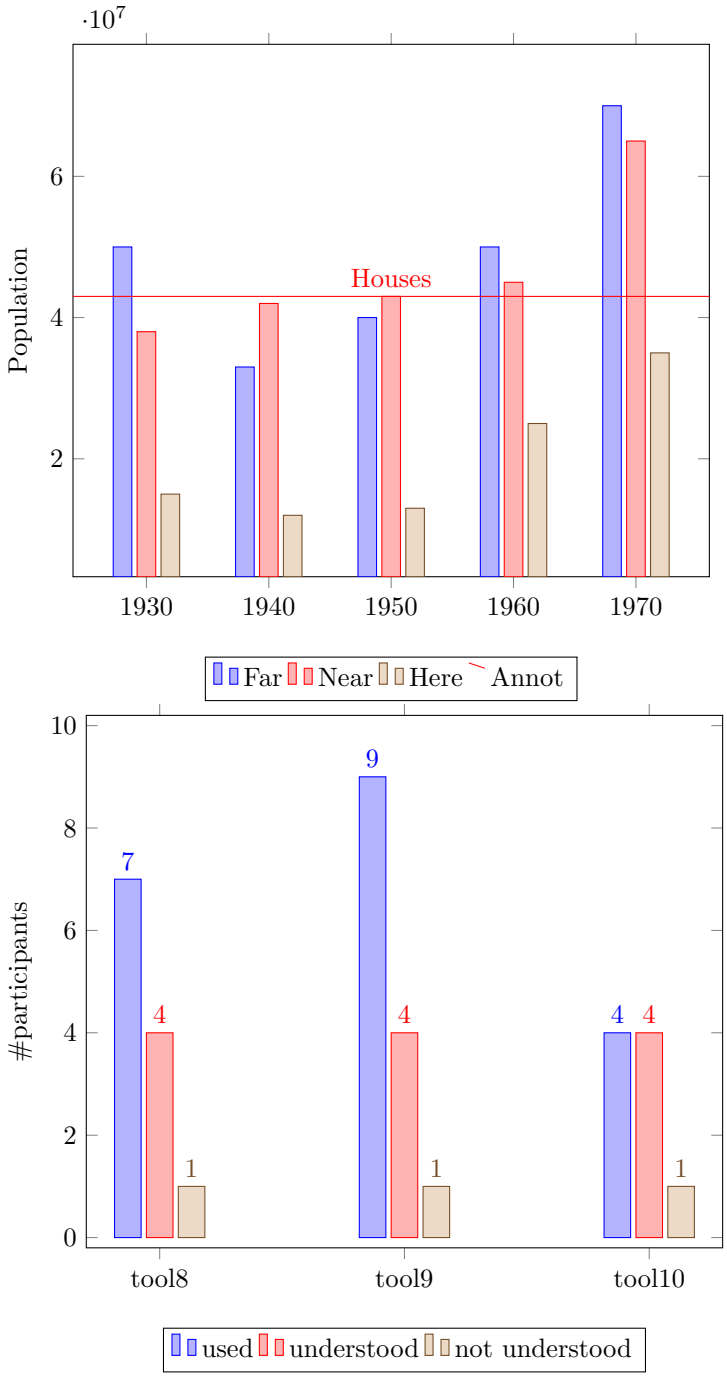



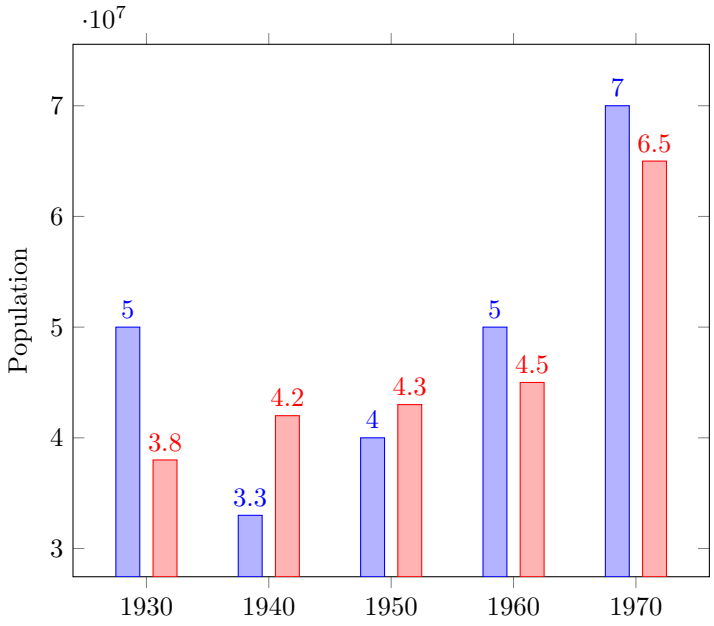



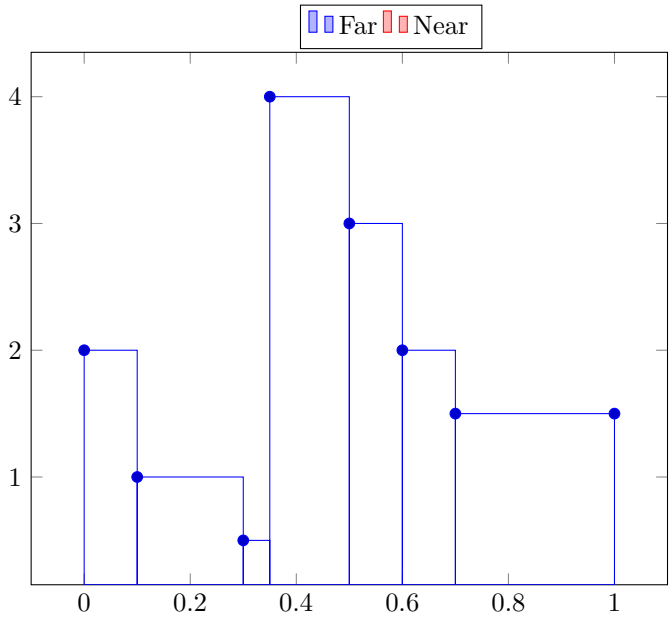

5
4
3
2
1
0
0
0.5
1
1.5
2
2.5
3
$10^1$
$10^0$
$10^{-1}$
$10^{-2}$
$10^{-3}$
$10^{-4}$
$10^{-5}$
$L_2$ error
$10^1$
$10^2$
$10^3$
$10^4$
Dof

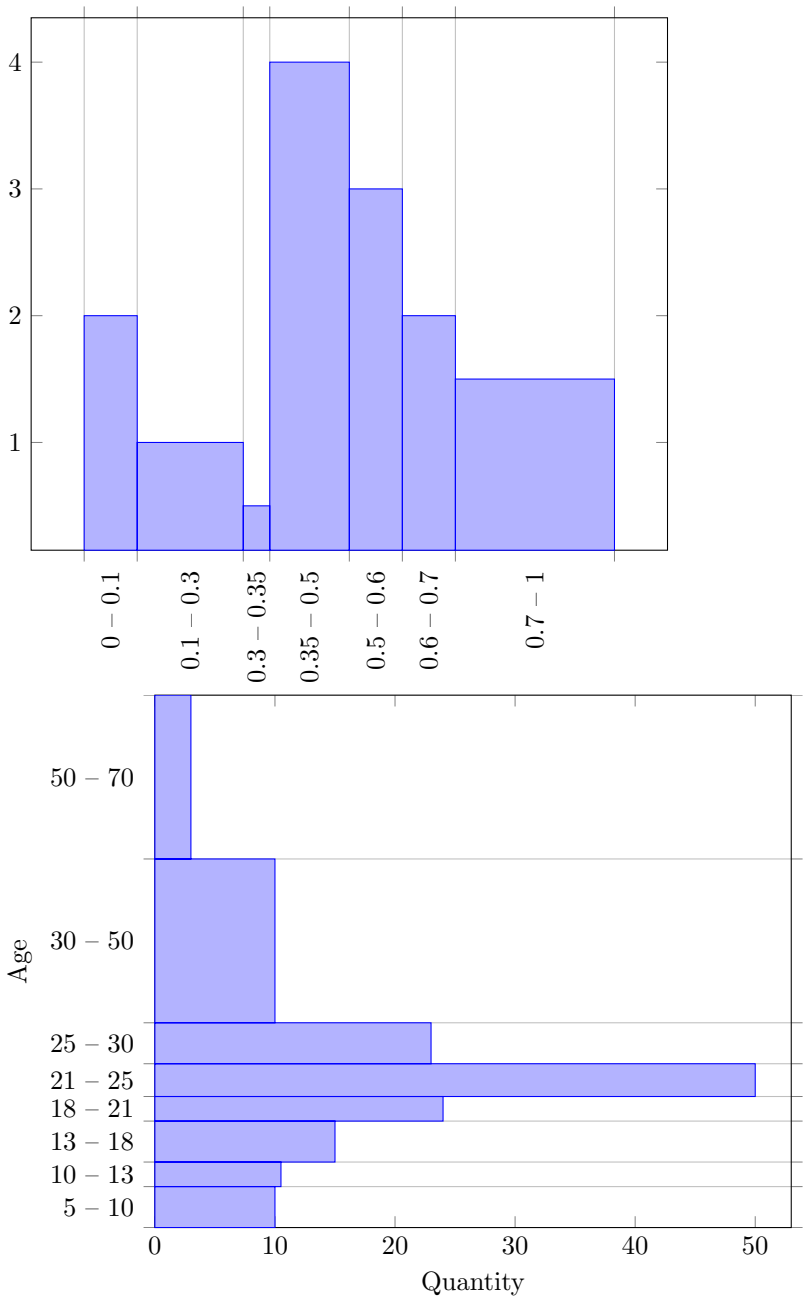
## 1.11 Bar Plots



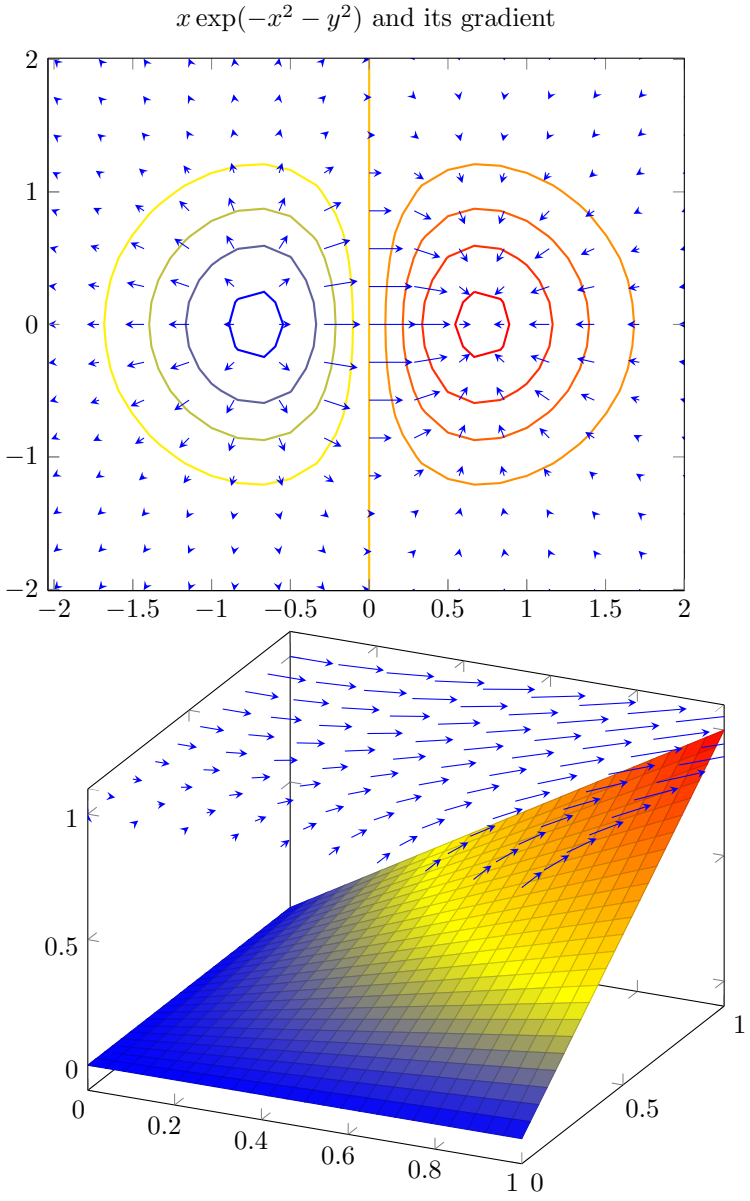

$\cdot 10^7$
Population
6
4
2
Houses
1930
1940
1950
1960
1970
Far
Near
Here
Annot
#participants
10
8
6
4
2
0
7
4
1
9
4
1
4
4
1
tool8
tool9
tool10
used
understood
not understood


$\cdot 10^7$
Population
7
6
5
4
3
5
3.8
3.3
4.2
4
4.3
5
4.5
7
6.5
1930
1940
1950
1960
1970

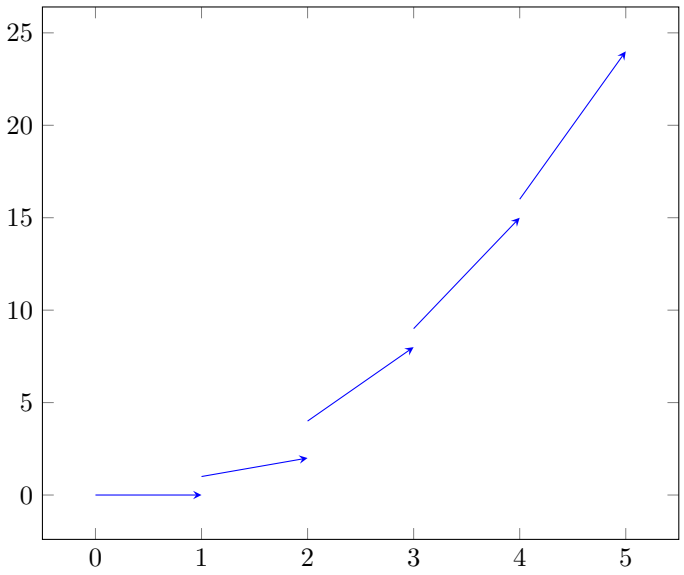

Far
Near
4
3
2
1
0
0.2
0.4
0.6
0.8
1


4
3
2
1
0 – 0.1
0.1 – 0.3
0.3 – 0.35
0.35 – 0.5
0.5 – 0.6
0.6 – 0.7
0.7 – 1
Age
50 – 70
30 – 50
25 – 30
21 – 25
18 – 21
13 – 18
10 – 13
5 – 10
0
10
20
30
40
50
Quantity

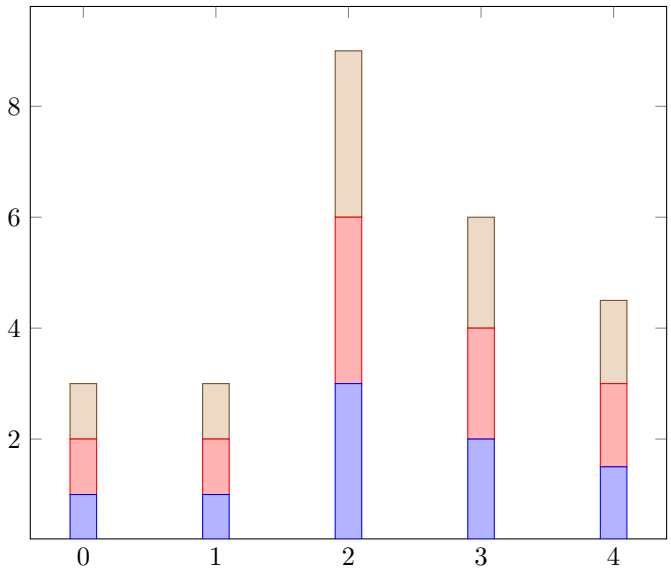
## 1.12 Quiver Plots

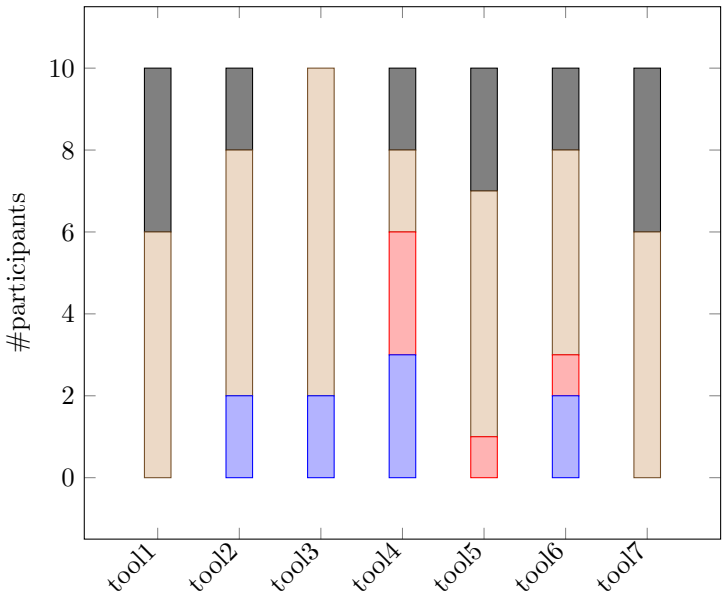


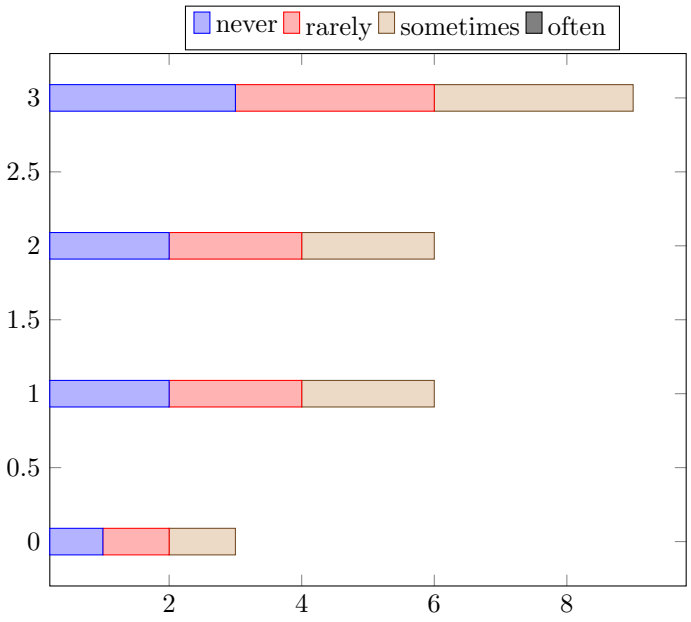
Quiver and plot table



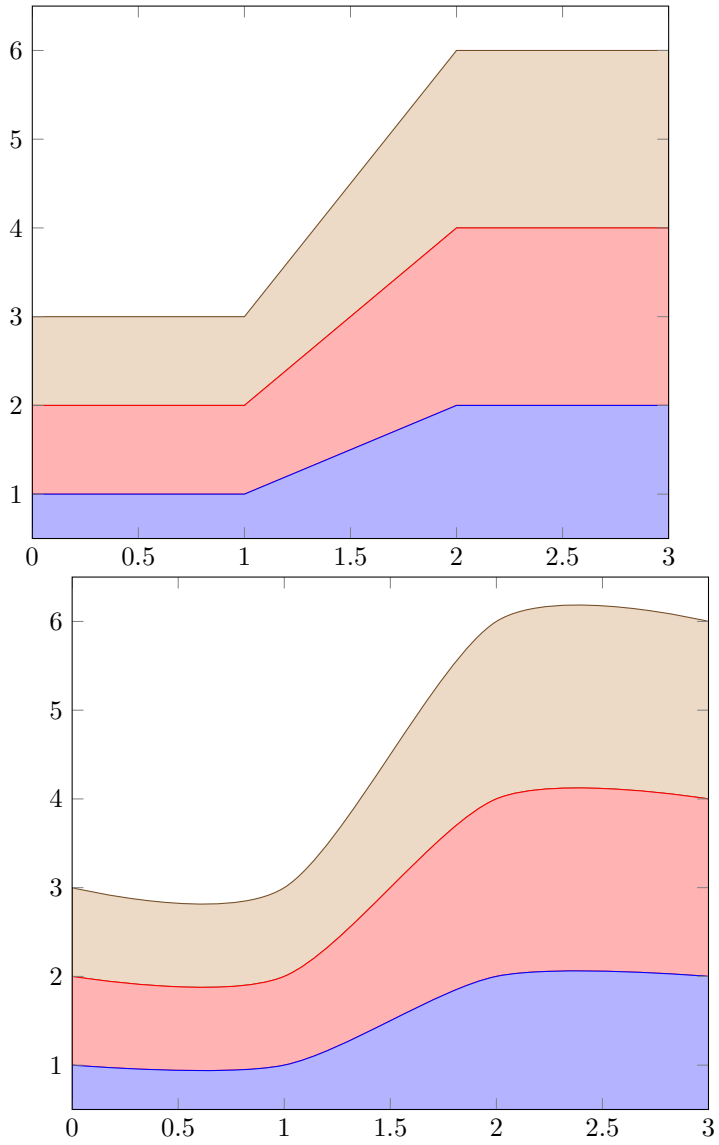

## 1.13 Stacked Plots



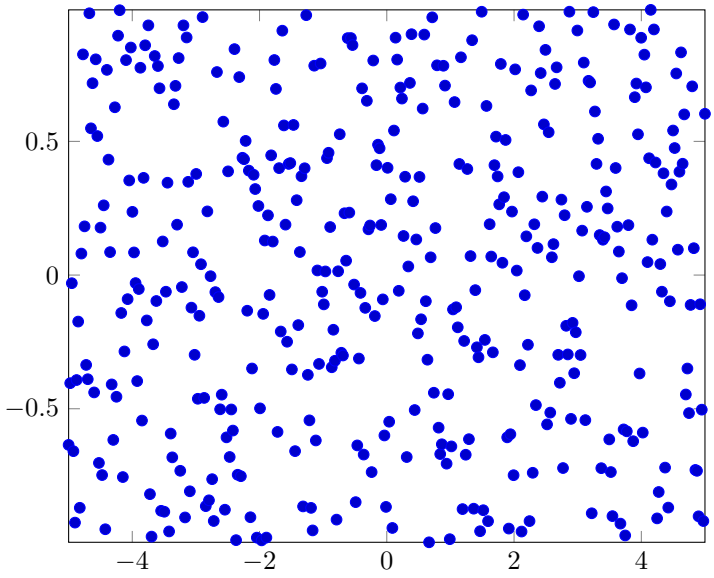

#participants
10
8
6
4
2
0
tool1
tool2
tool3
tool4
tool5
tool6
tool7

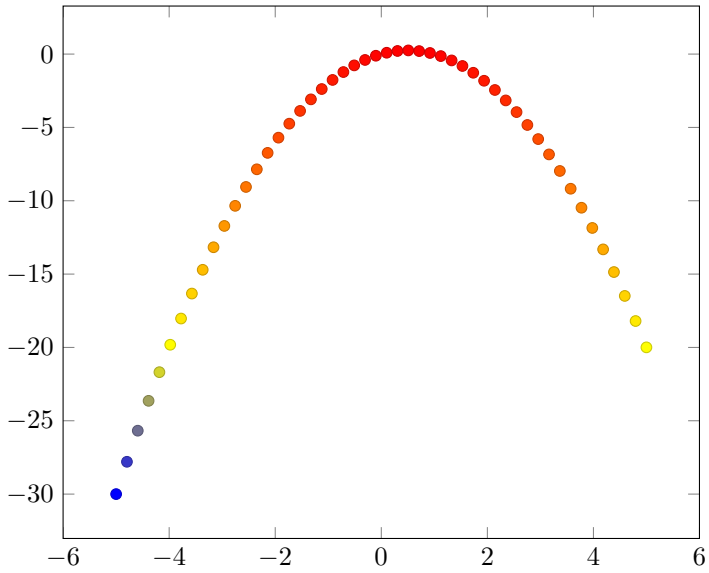

never
rarely
sometimes
often
3
2.5
2
1.5
1
0.5
0
2
4
6
8

## 1.14 Area Plots

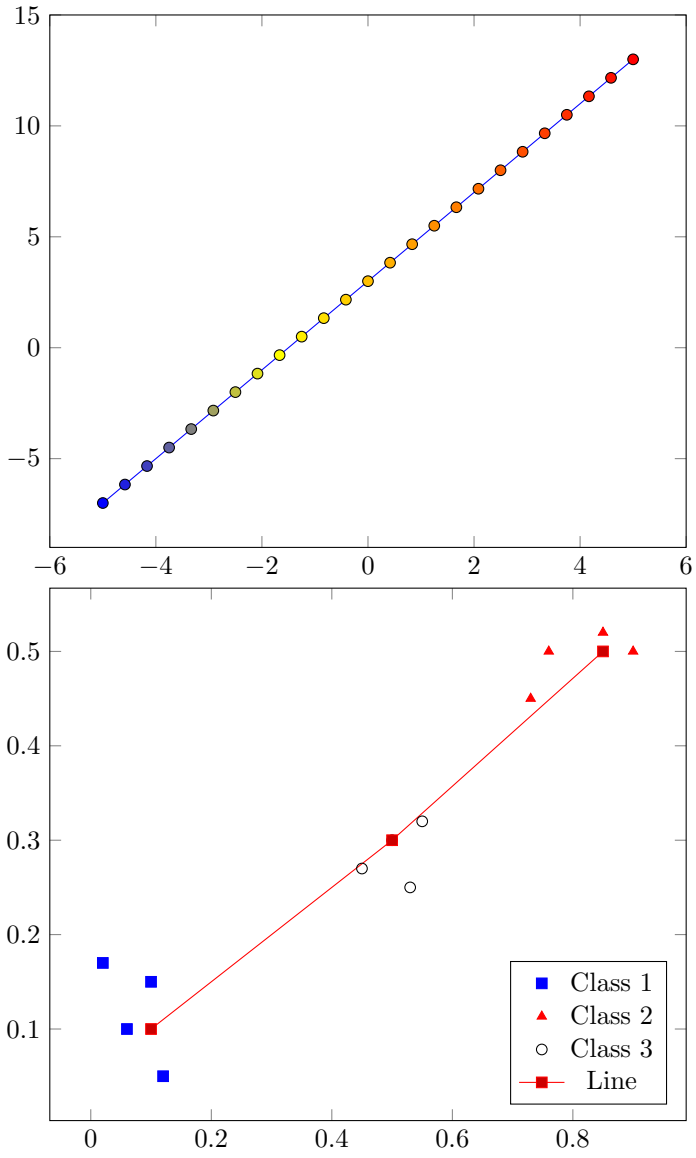


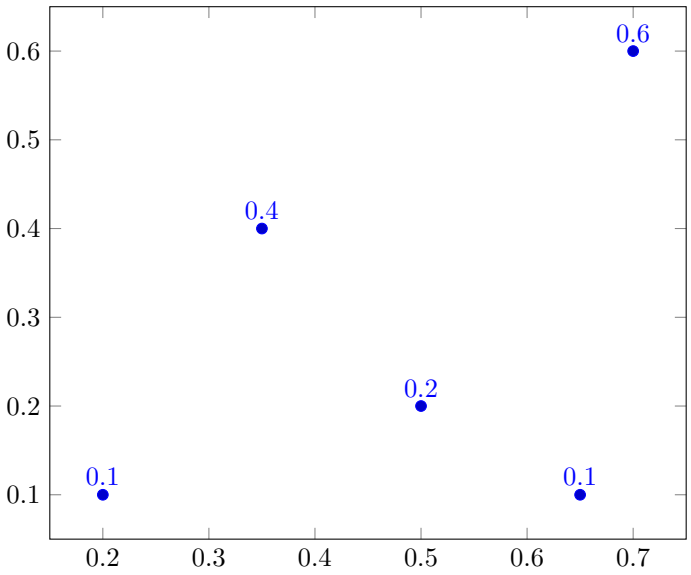
## 1.15 Scatter Plots

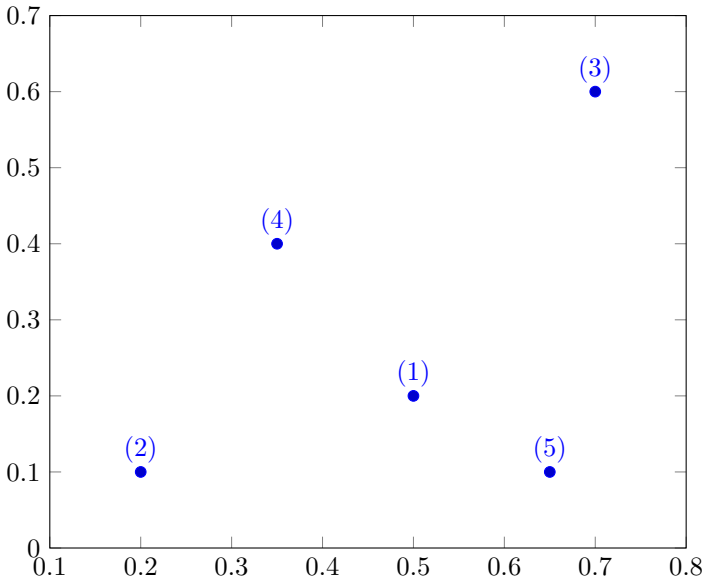


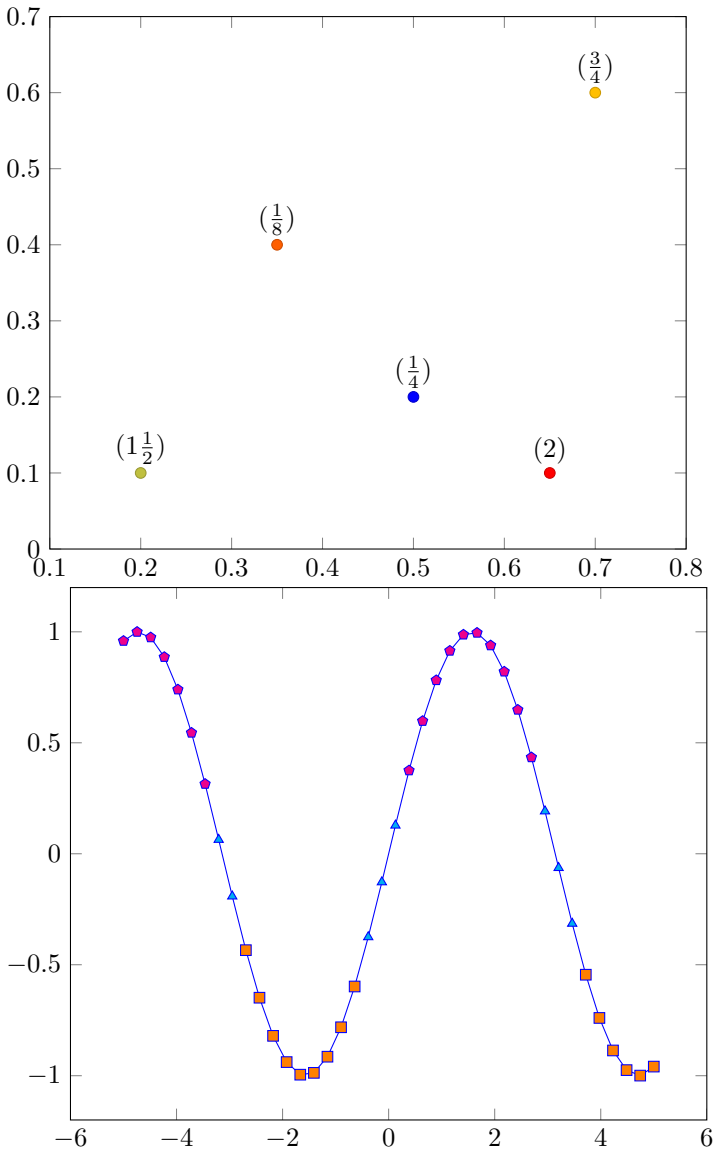



Black draw color and varying fill color

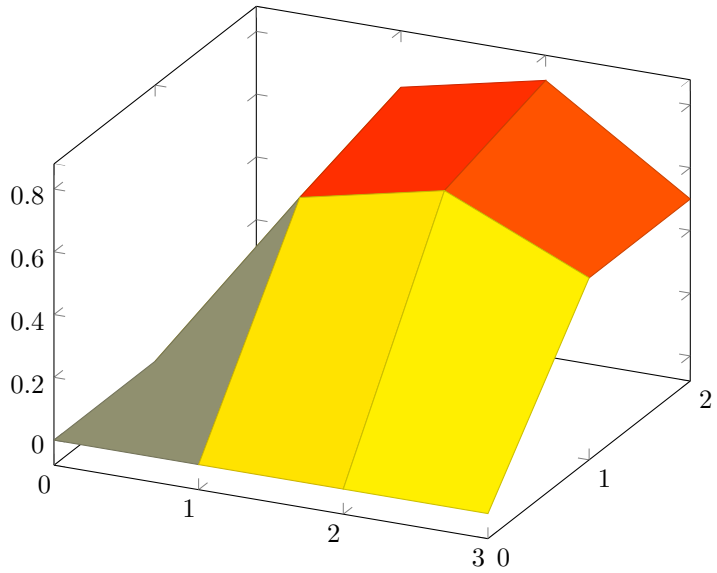


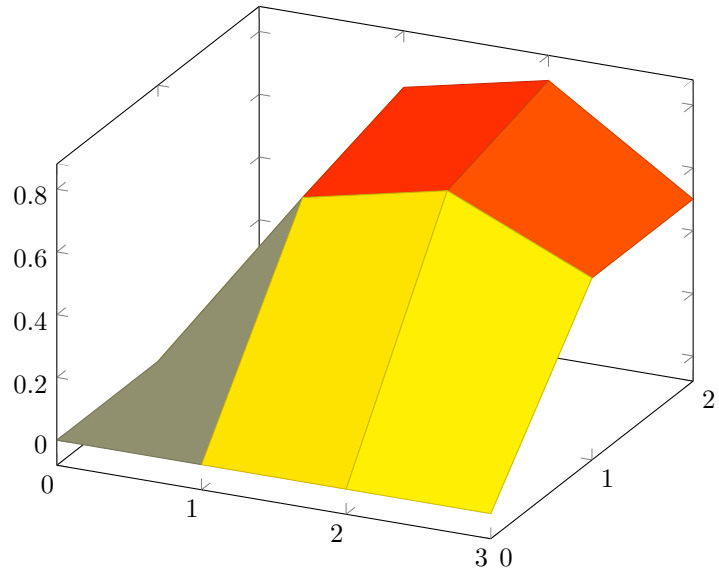

0.6
0.4
0.2
0.1
0.1
0.6
0.5
0.4
0.3
0.2
0.1
0.2
0.3
0.4
0.5
0.6
0.7

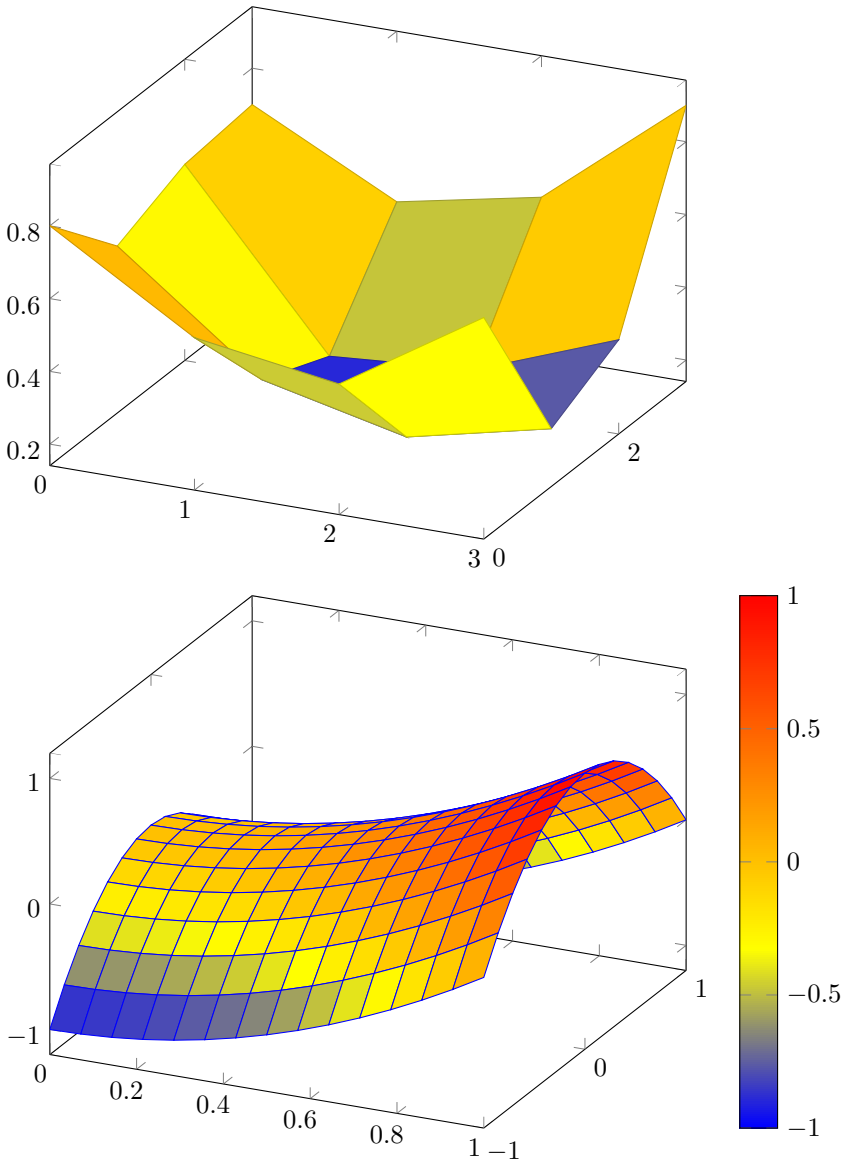

(3)
(4)
(1)
(2)
(5)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8

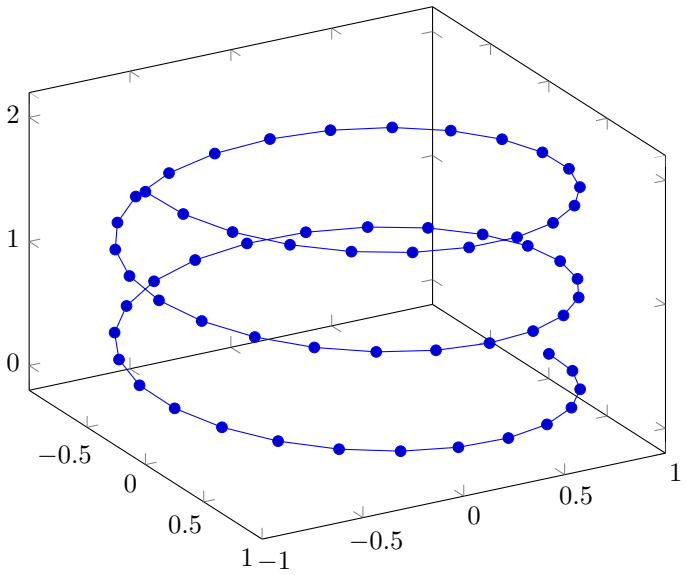

0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
$(\frac{3}{4})$
$(\frac{1}{8})$
$(\frac{1}{4})$
$(1\frac{1}{2})$
(2)
1
0.5
0
−0.5
−1
−6
−4
−2
0
2
4
6

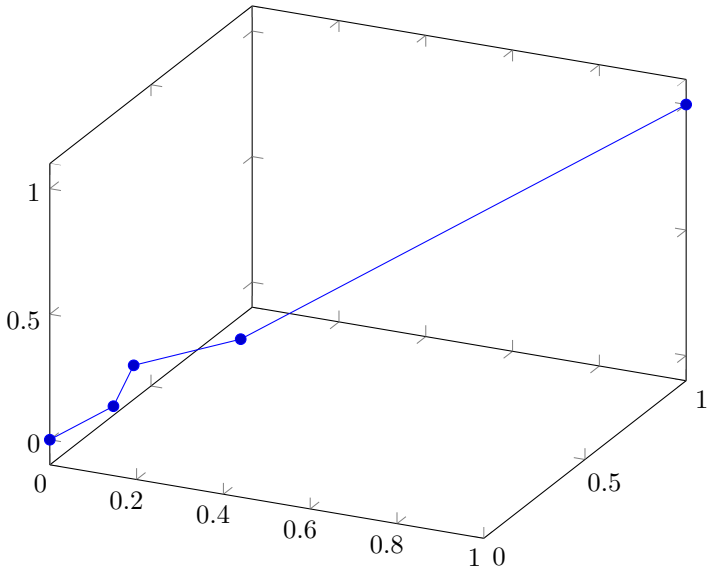
### 1.16 3d plots

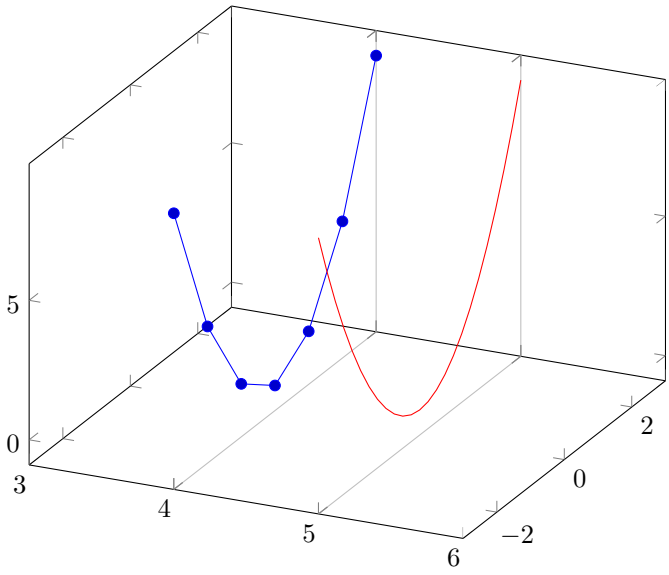


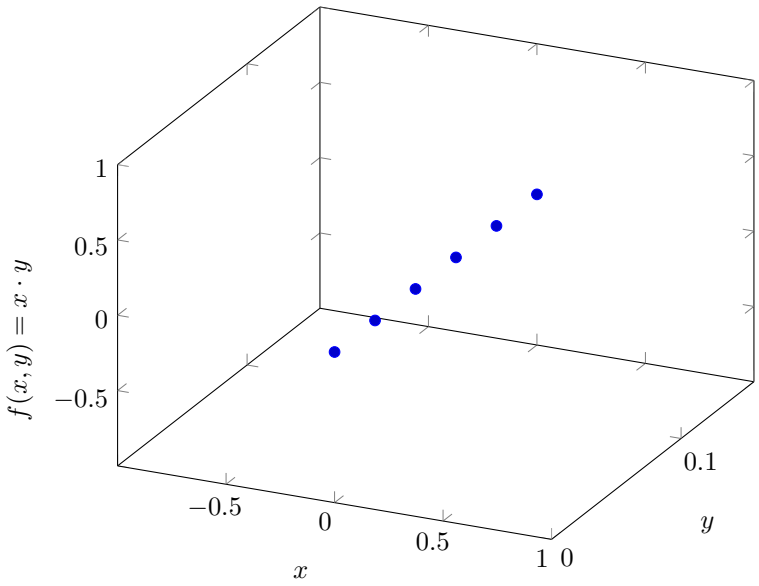

0.8
0.6
0.4
0.2
0
1
2
3
0
2
1
0
−1
0
0.2
0.4
0.6
0.8
1
−1
0
1
0.5
0
−0.5
−1


2
1
0
−0.5
0
0.5
1 −1
−0.5
0
0.5
1

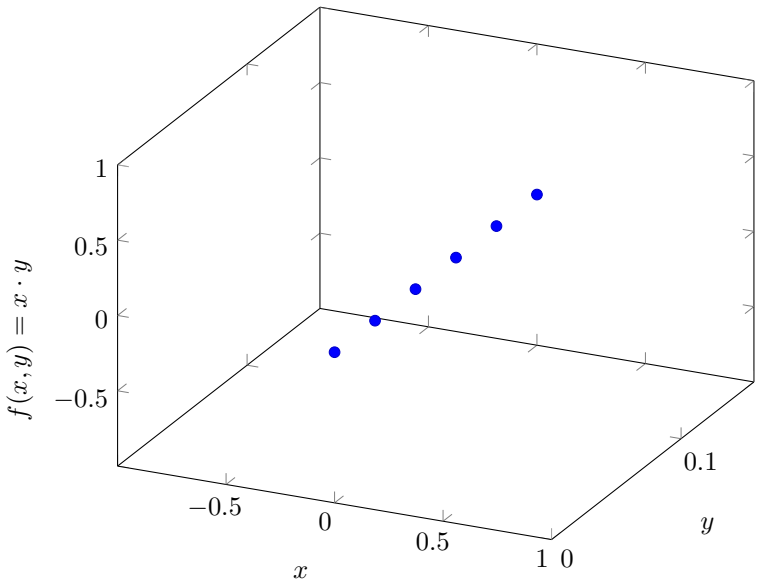

1
0.5
0
0
0.2
0.4
0.6
0.8
1 0
0.5
1

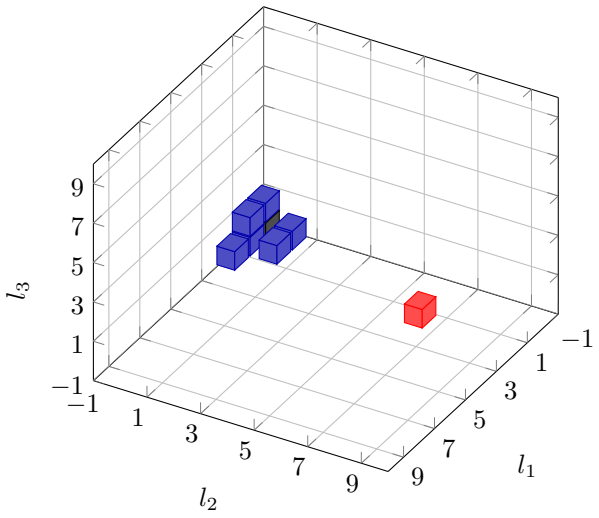

5
0
3
4
5
6
−2
0
2

A Scatter Plot Example

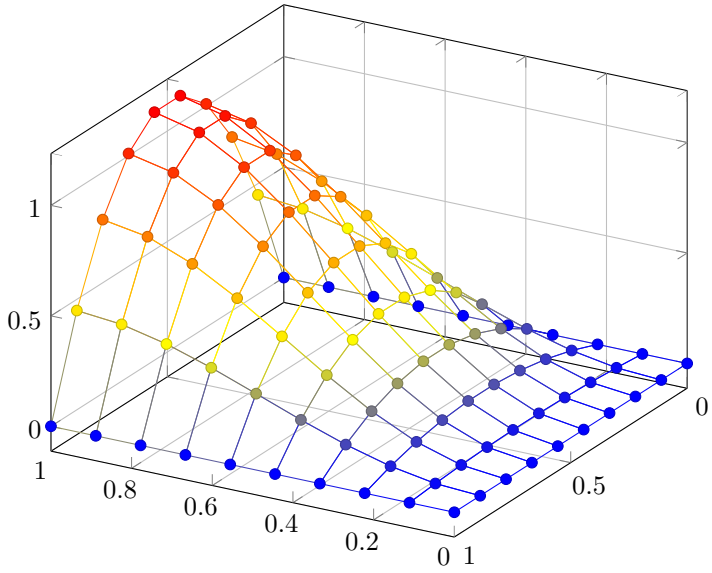


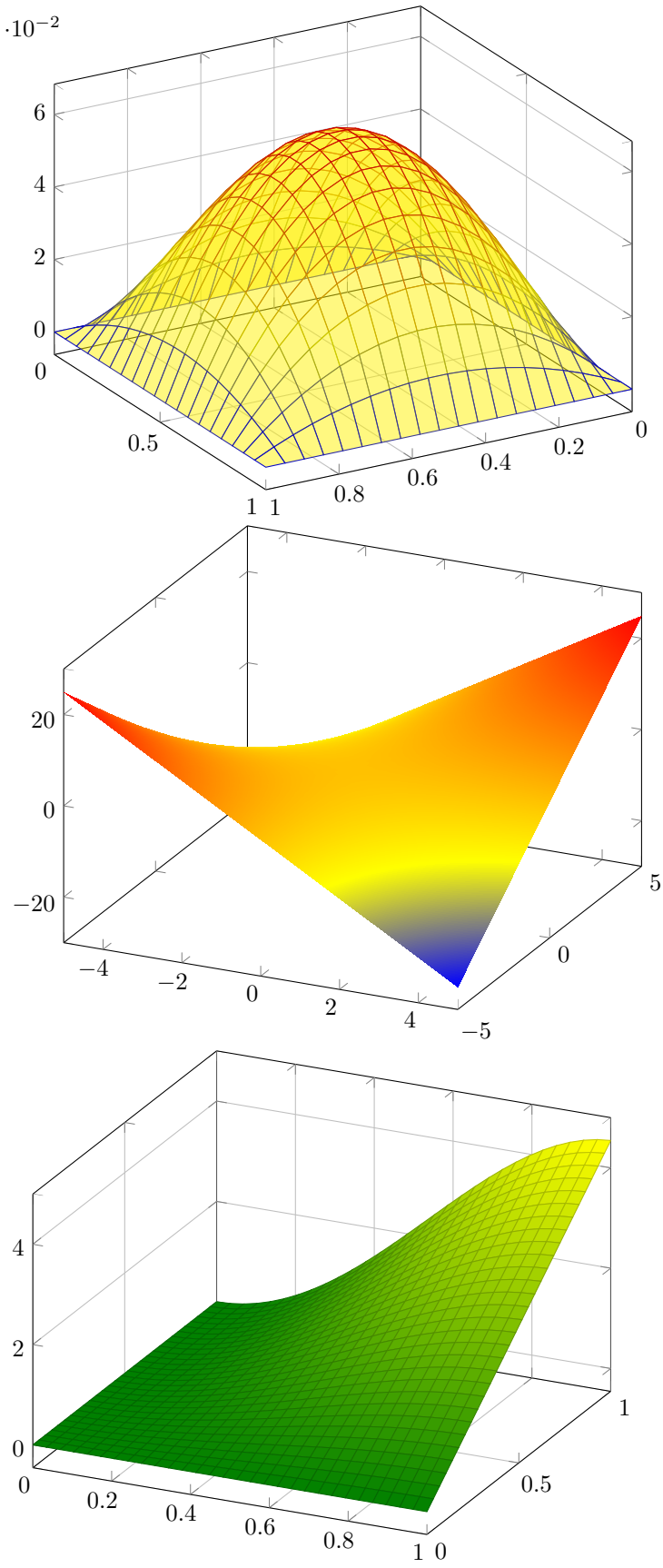

A Scatter Plot Example

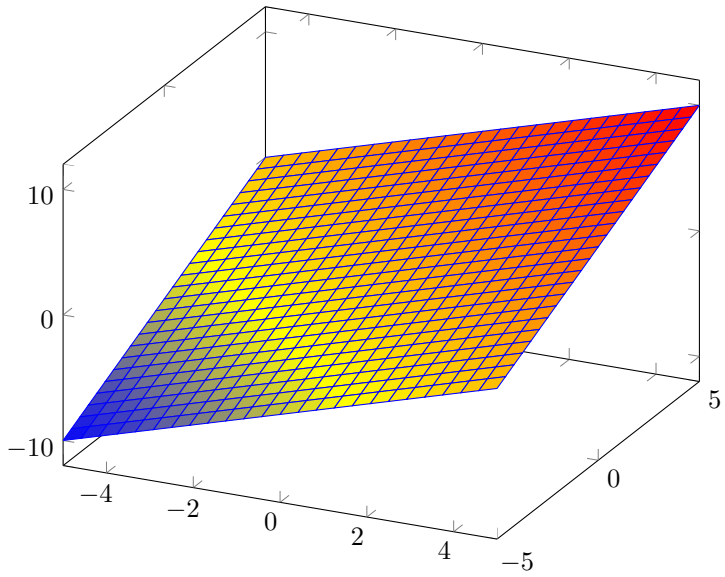


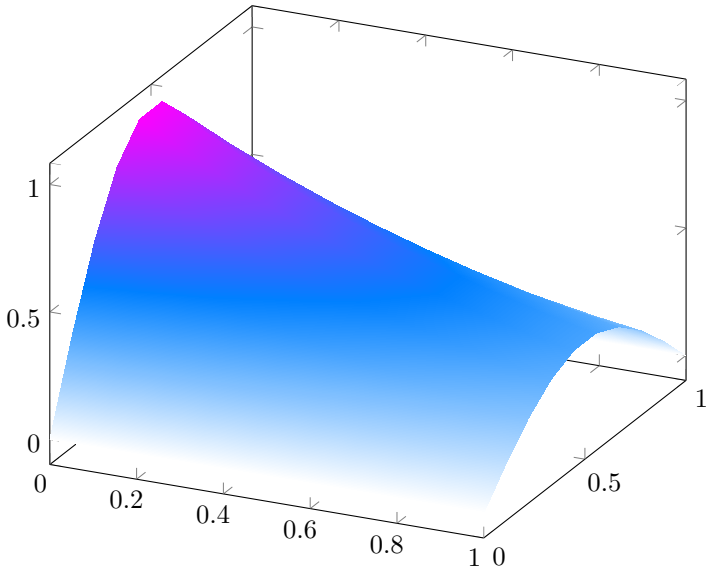


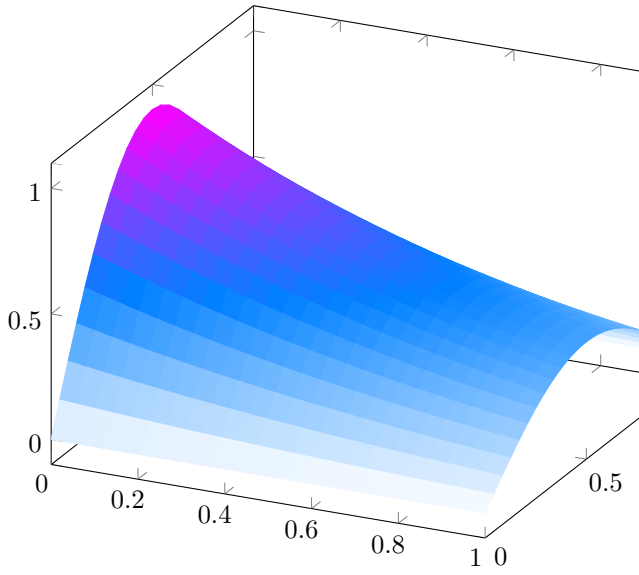

## 1.17 3d scatter plots

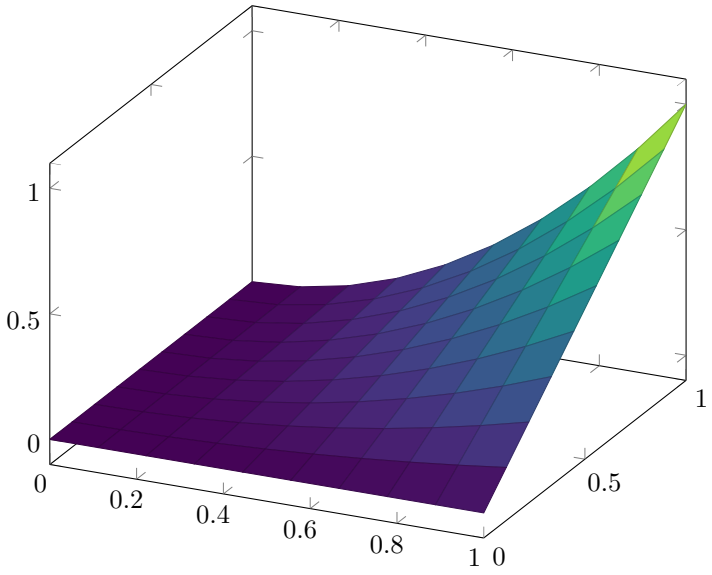


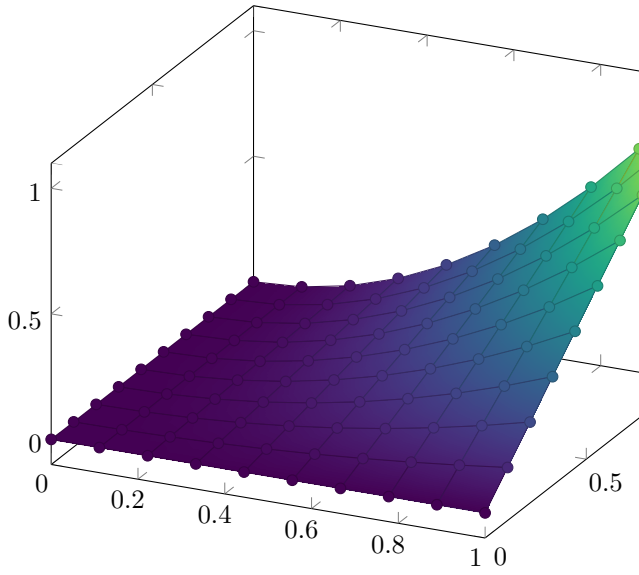

$\cdot 10^{-2}$
6
4
2
0
0
0.5
1
1
0.8
0.6
0.4
0.2
0
20
0
−20
−4
−2
0
2
4
−5
0
5
4
2
0
0
0.2
0.4
0.6
0.8
1
0
0.5
1

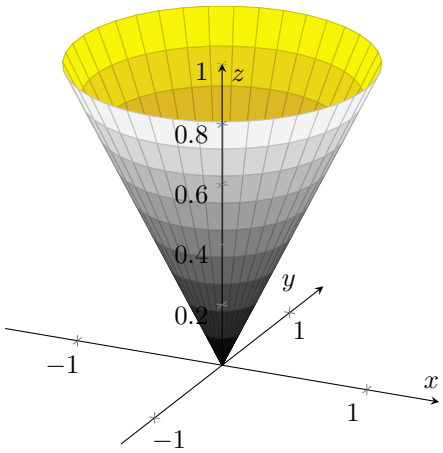

10
0
−10
−4
−2
0
2
4
5
0
−5

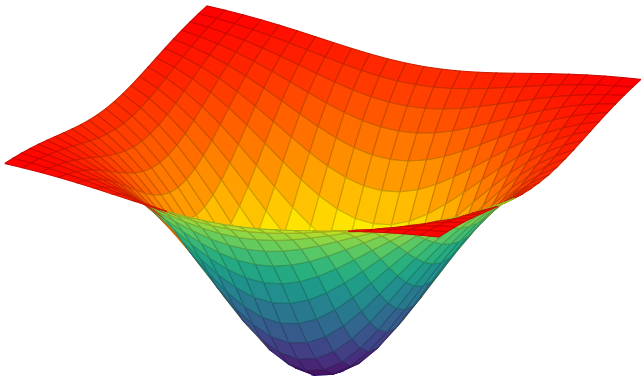

1
0.5
0
0
0.2
0.4
0.6
0.8
1
0
0.5
1


1
0.5
0
0
0.2
0.4
0.6
0.8
1
0
0.5

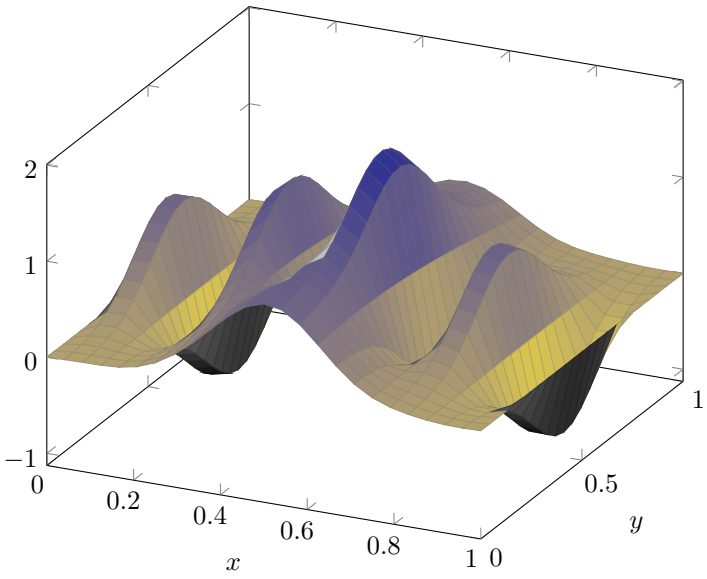

1
0.5
0
0
0.2
0.4
0.6
0.8
1
0
0.5
1


1
0.5
0
0
0.2
0.4
0.6
0.8
1
0
0.5

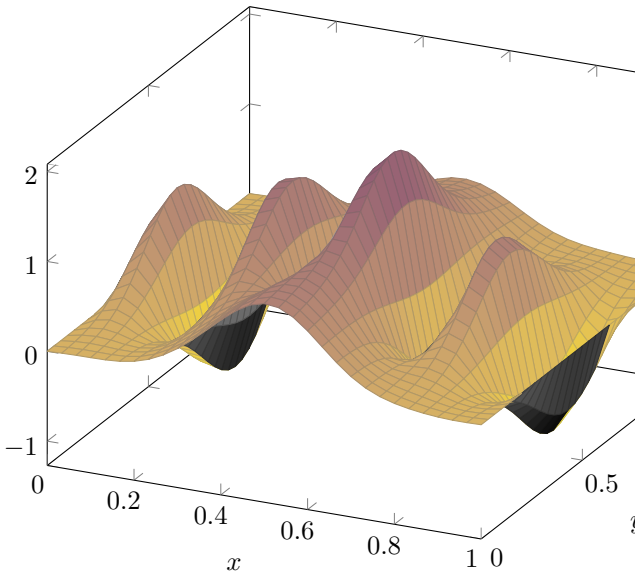


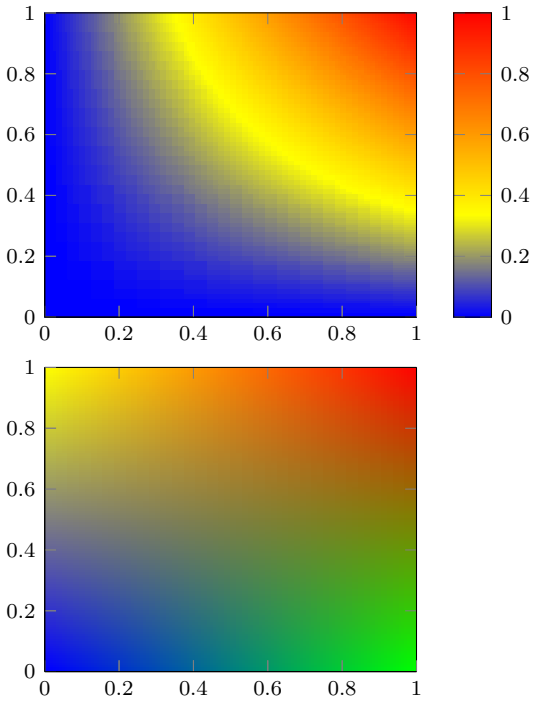



Example needing fine-tuning

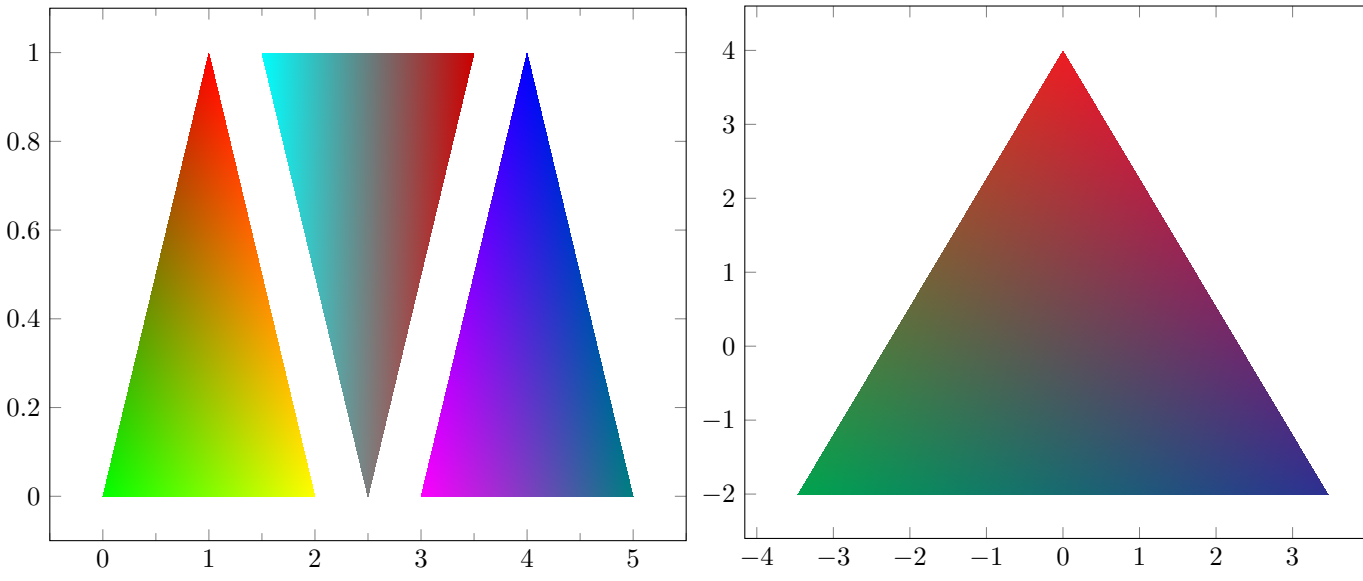



Example needing fine-tuning

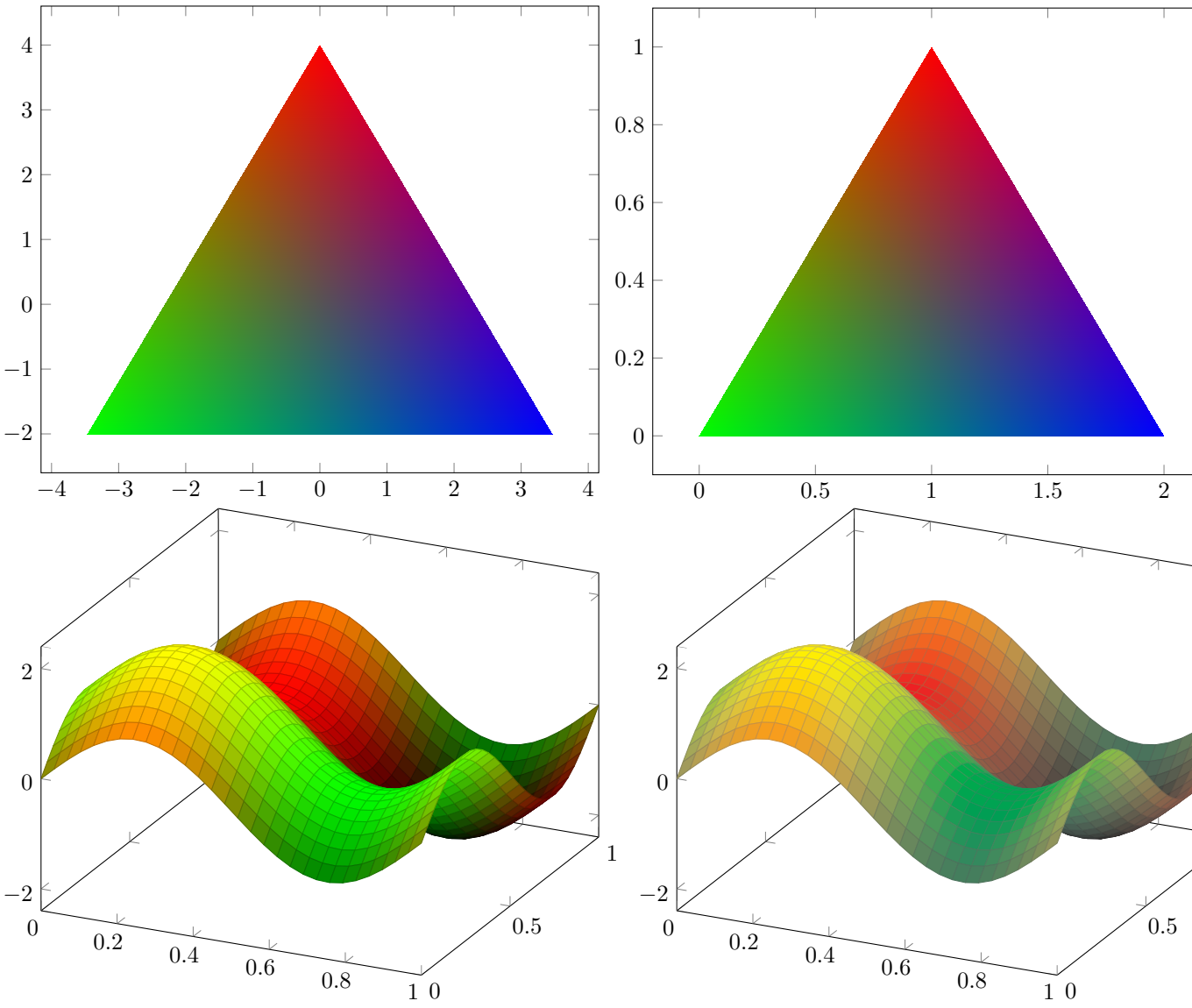




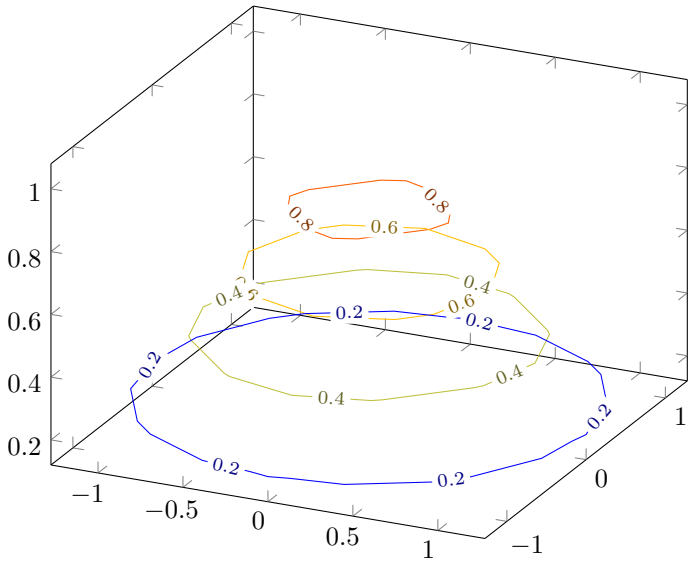

CMYK shading

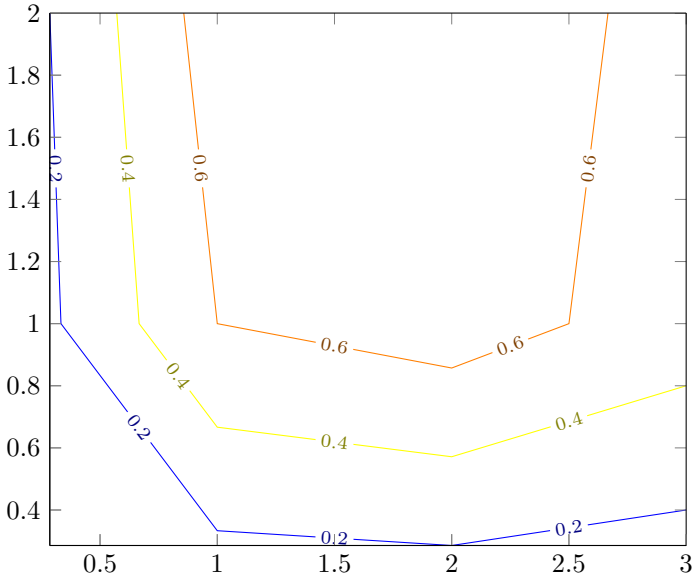


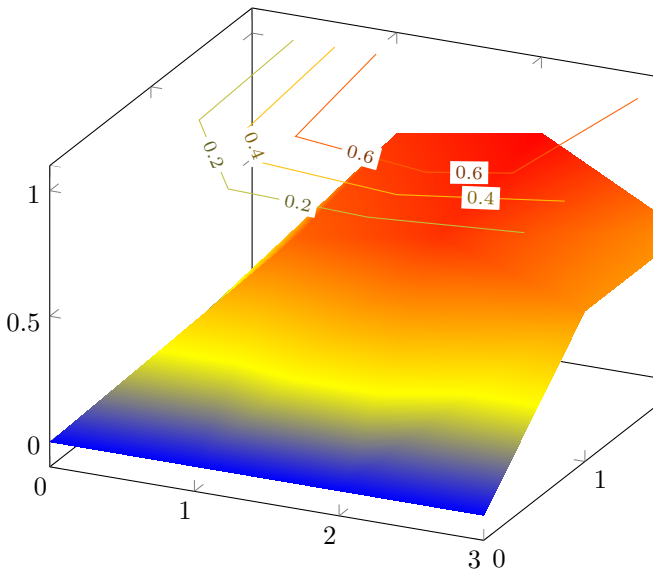
RGB shading

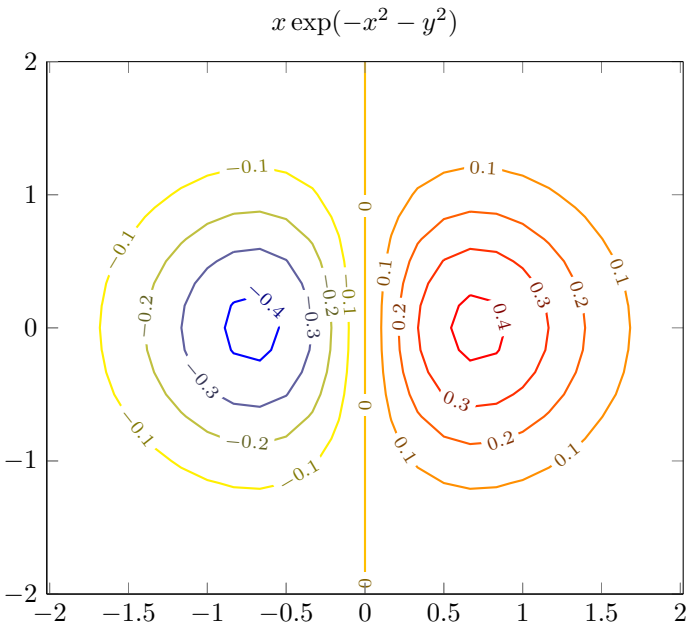

4
3
2
1
0
−1
−2
−4 −3 −2 −1 0 1 2 3 4
1
0.8
0.6
0.4
0.2
0
0 0.5 1 1.5 2
2
0
−2
0 0.2 0.4 0.6 0.8 1
0 0.5 1
2
0
−2
0 0.2 0.4 0.6 0.8 1
0 0.5

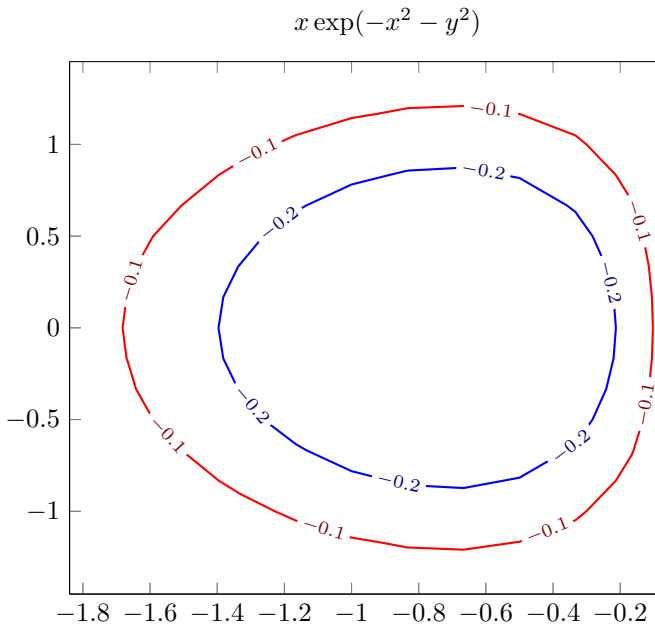
## 1.18 Contour Plots

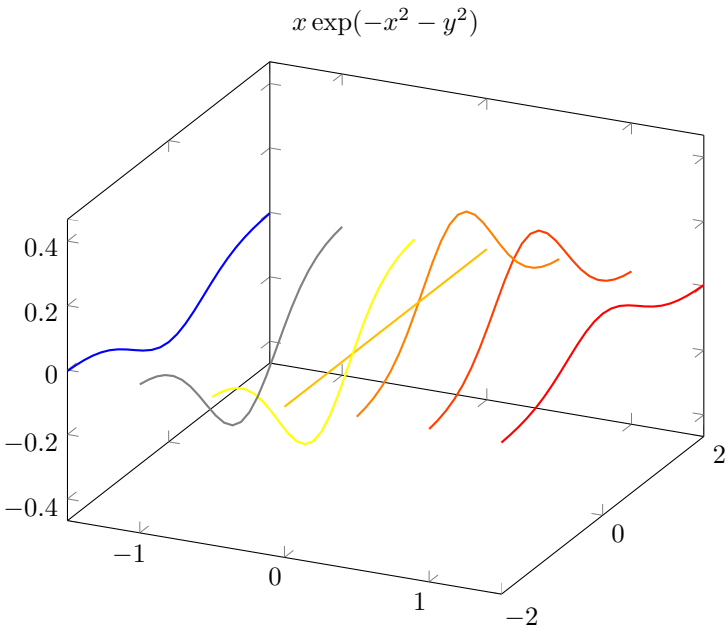


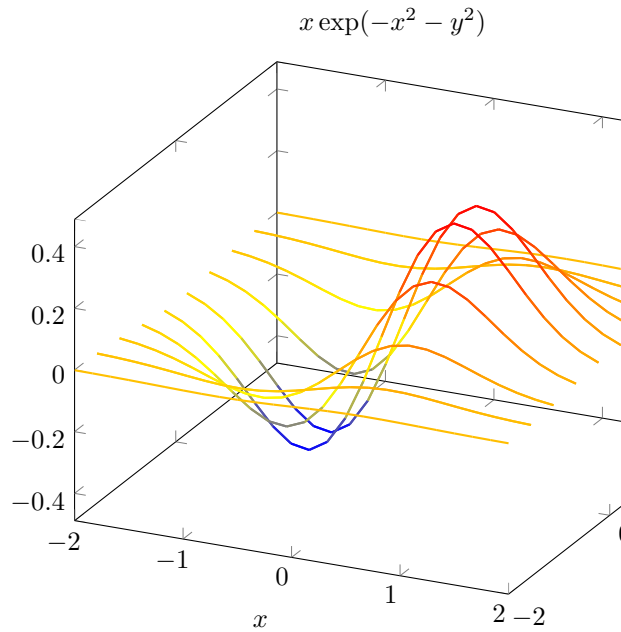



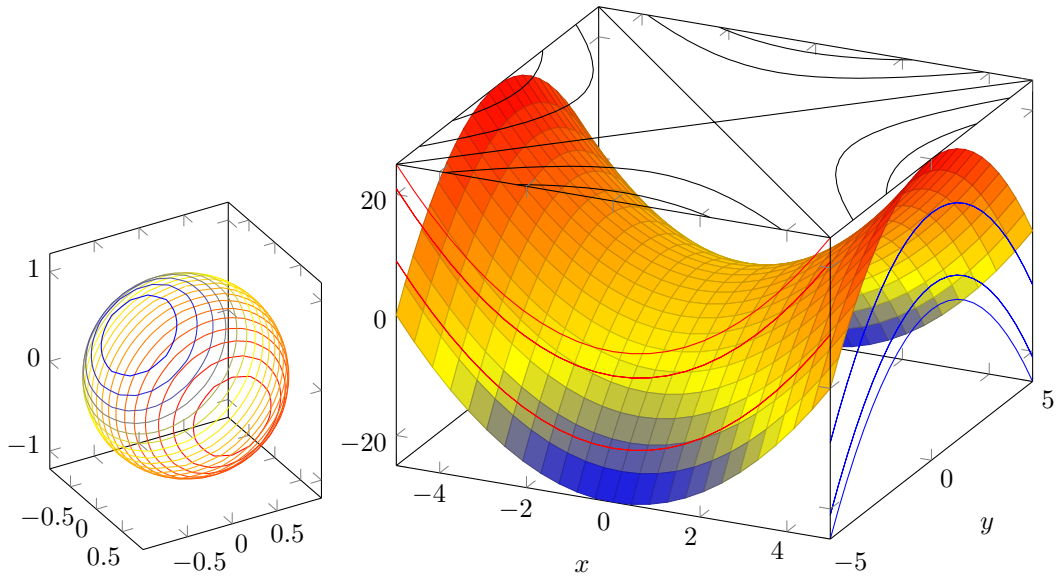




$x \exp(-x^2 - y^2)$

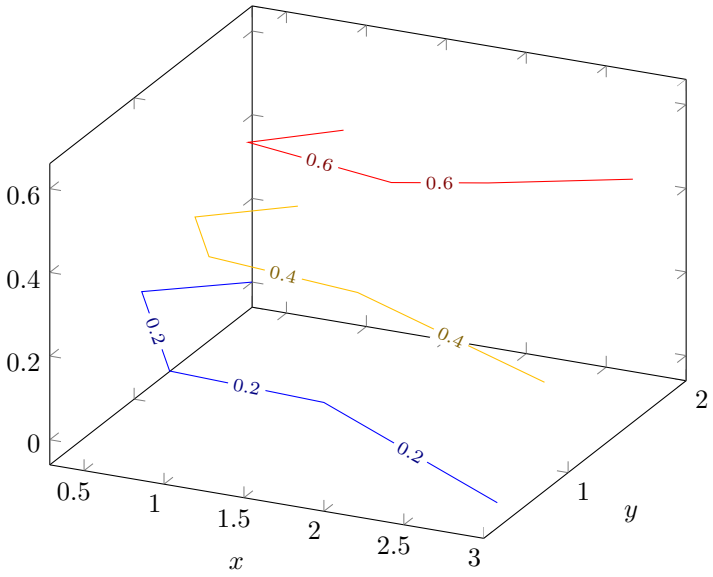

$x \exp(-x^2 - y^2)$


$x \exp(-x^2 - y^2)$

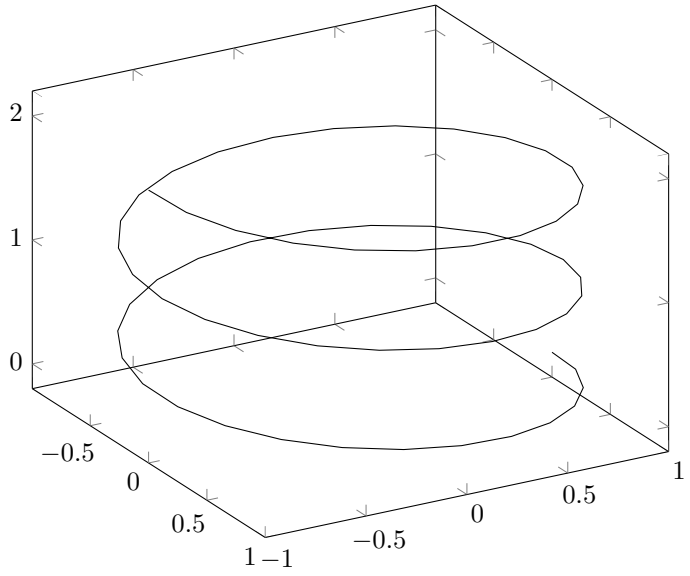

$x \exp(-x^2 - y^2)$
$x$

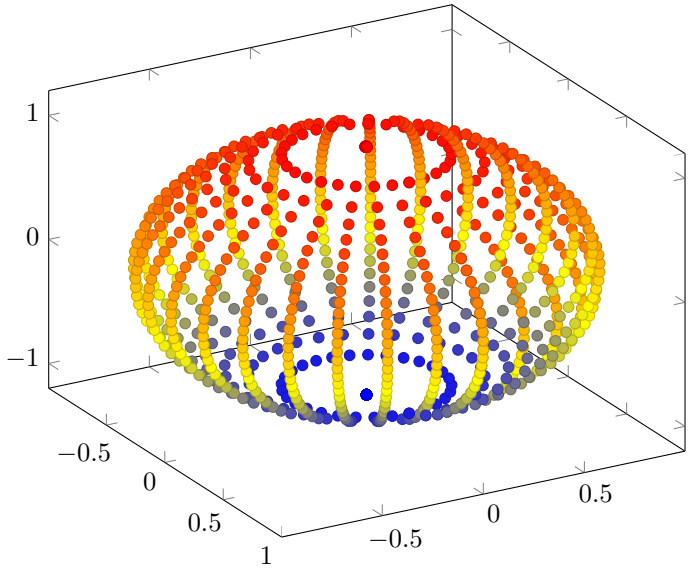


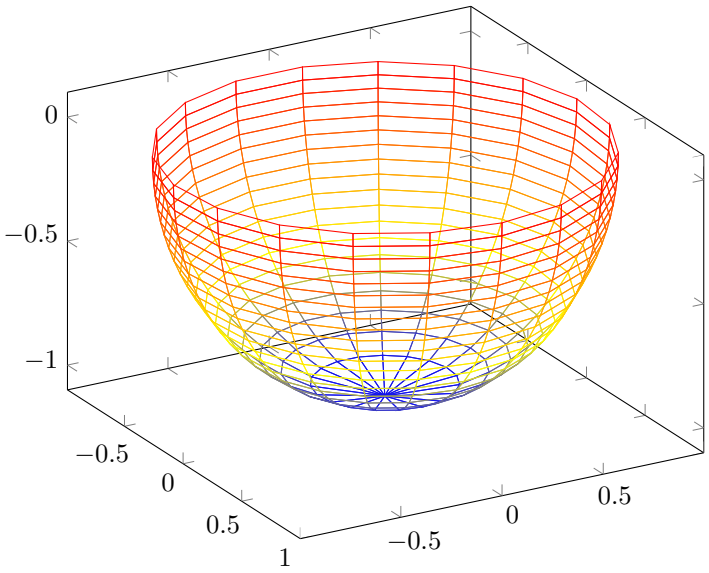

Separating $z$ from Color Value

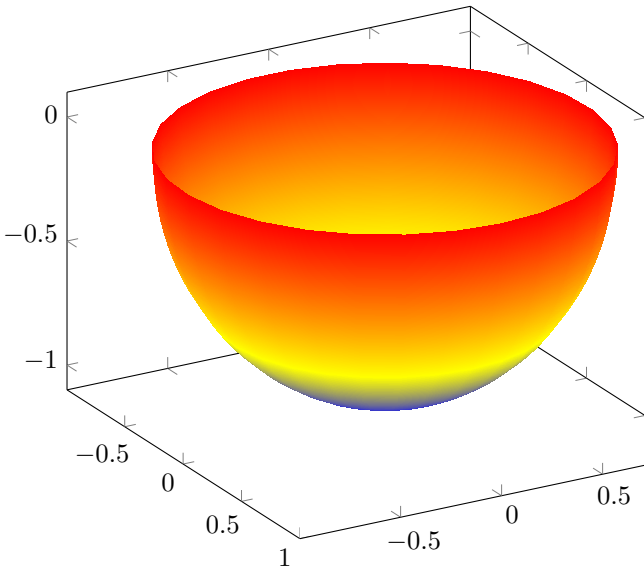


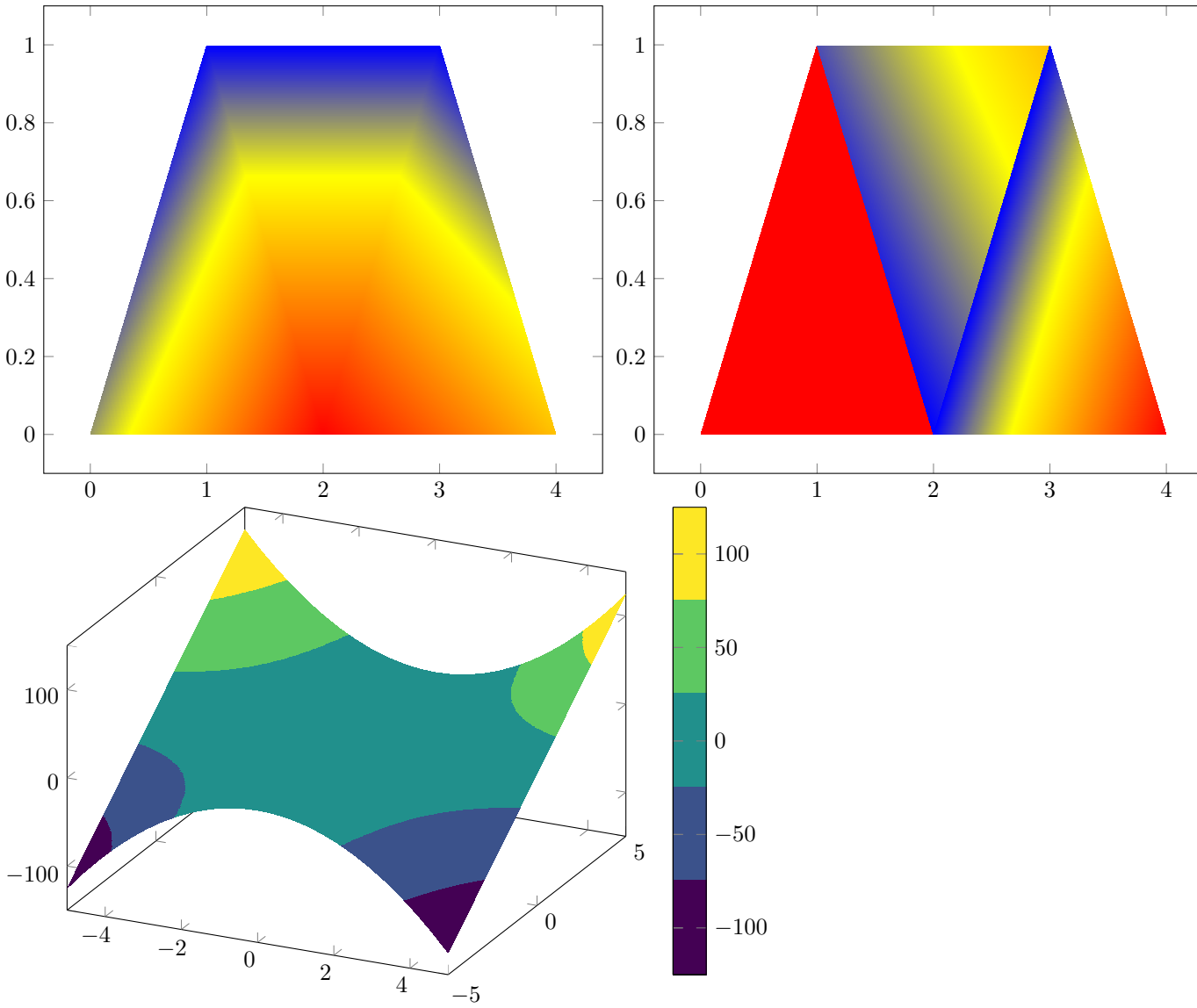
## 1.19 Parameterized Plots

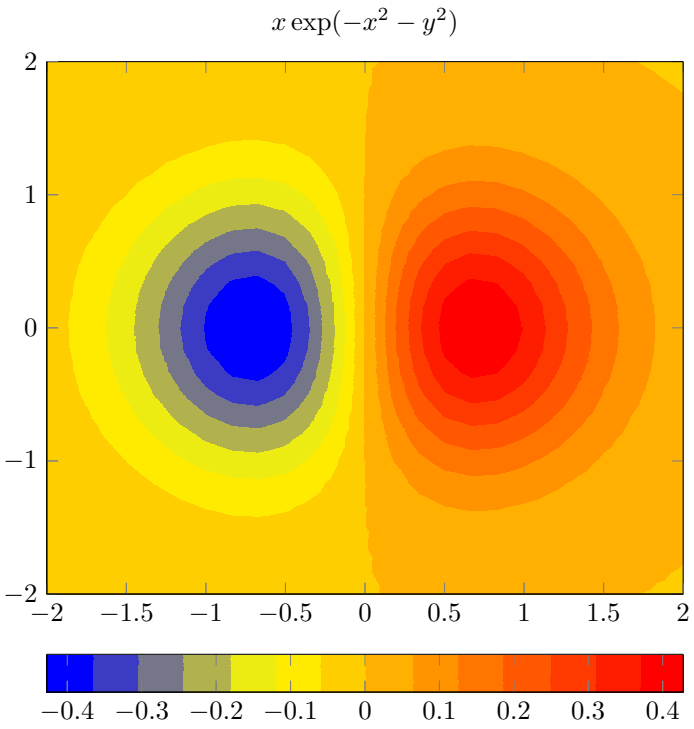


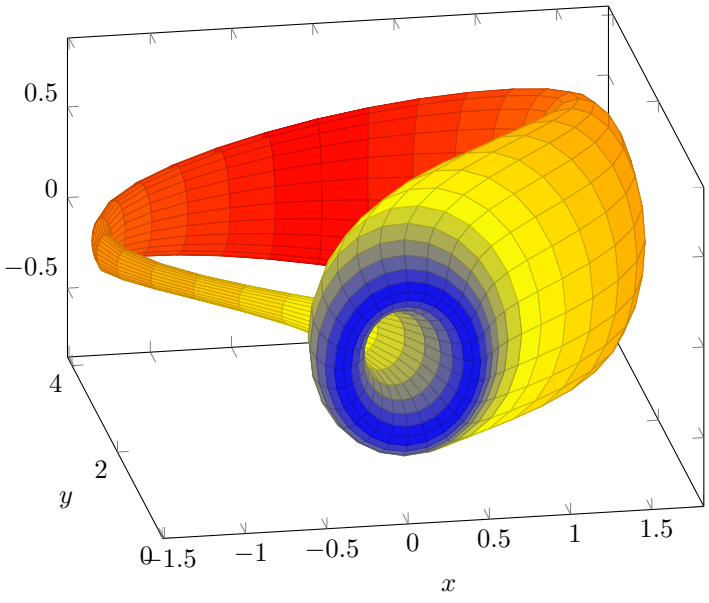



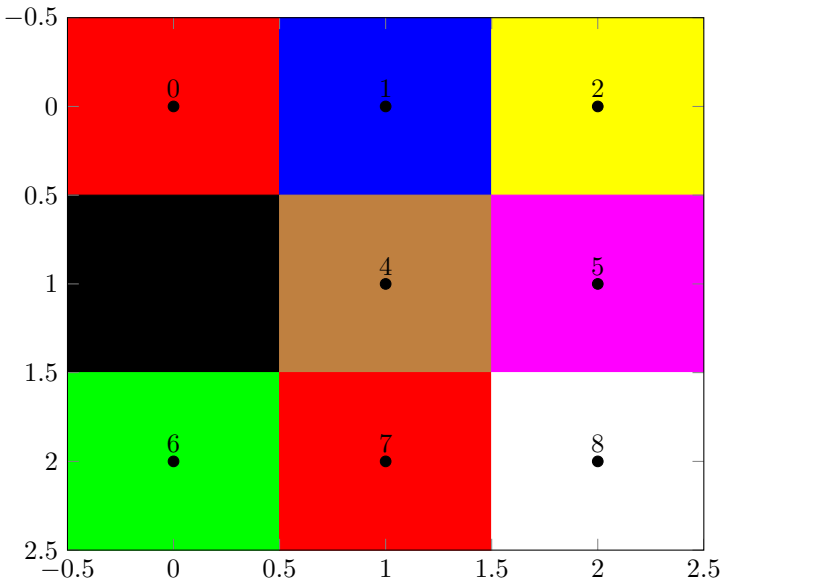



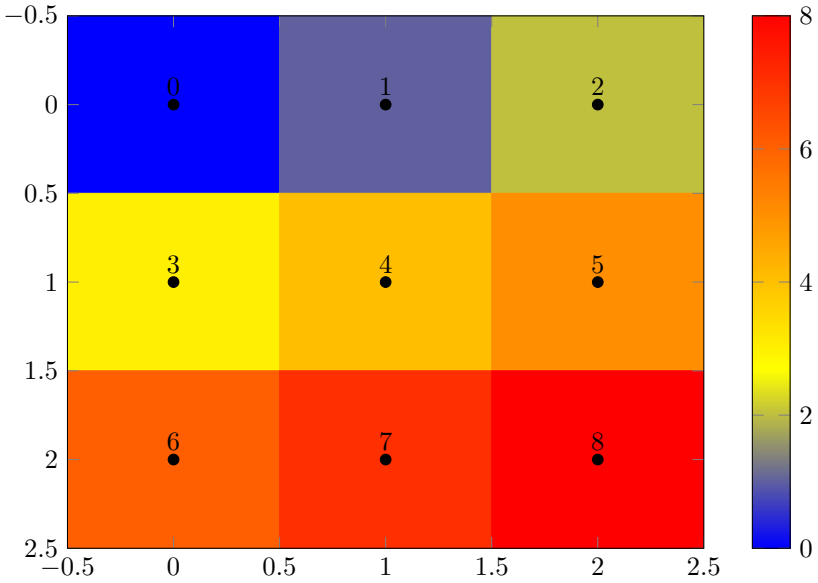

1
0.8
0.6
0.4
0.2
0
0
1
2
3
4
1
0.8
0.6
0.4
0.2
0
0
1
2
3
4
100
0
−100
−4
−2
0
2
4
−5
0
5
100
50
0
−50
−100

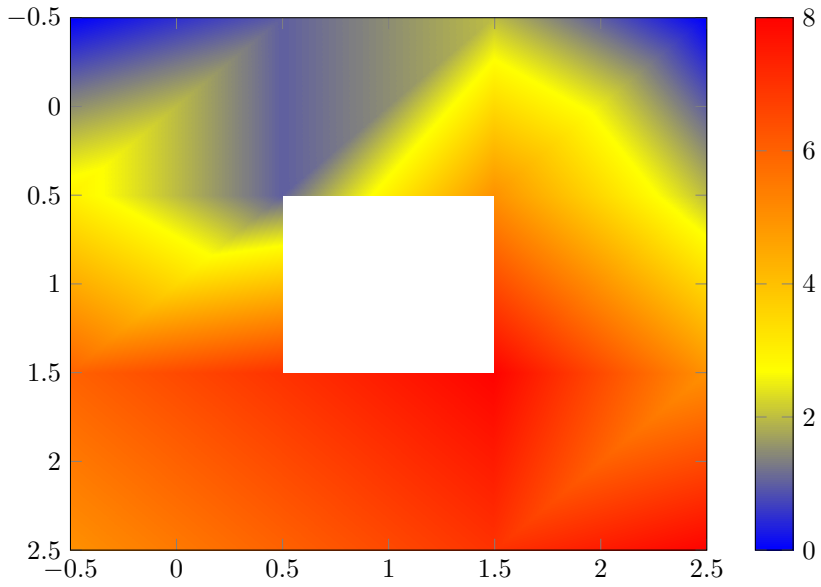


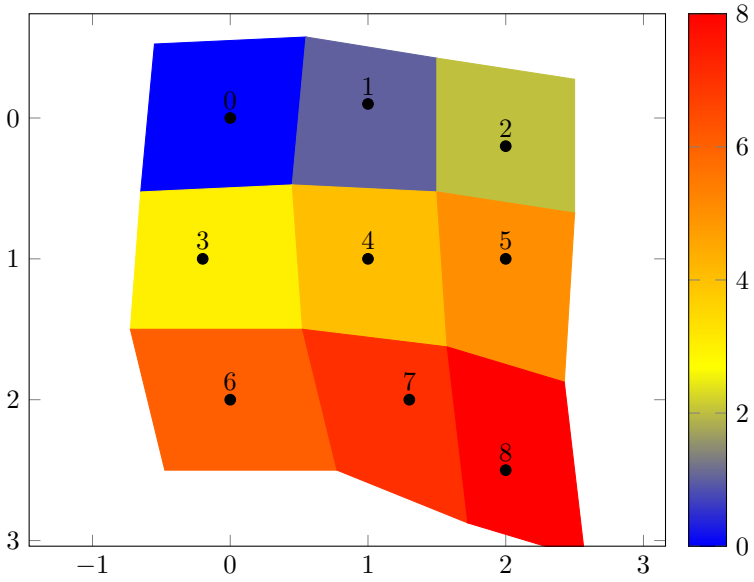

urlhttp://en.wikipedia.org/wiki/Klein_bottle



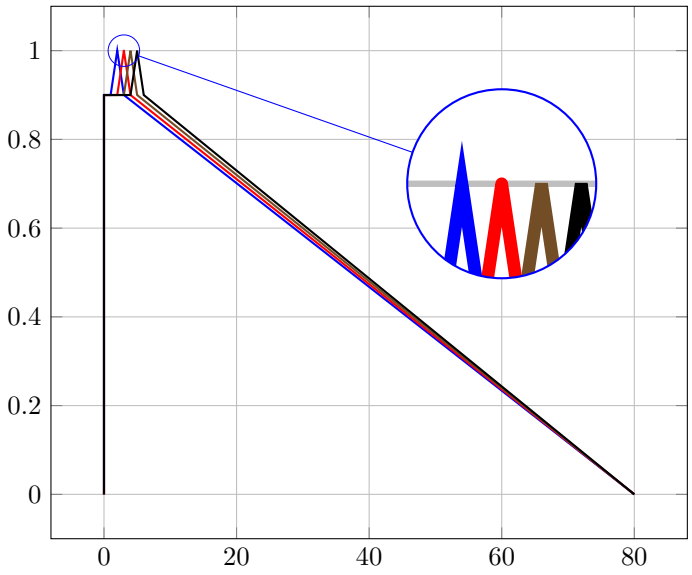

0
1
2
4
5
6
7
8
−0.5
0
0.5
1
1.5
2
2.5


0
1
2
3
4
5
6
7
8
−0.5
0
0.5
1
1.5
2
2.5
0
2
4
6
8

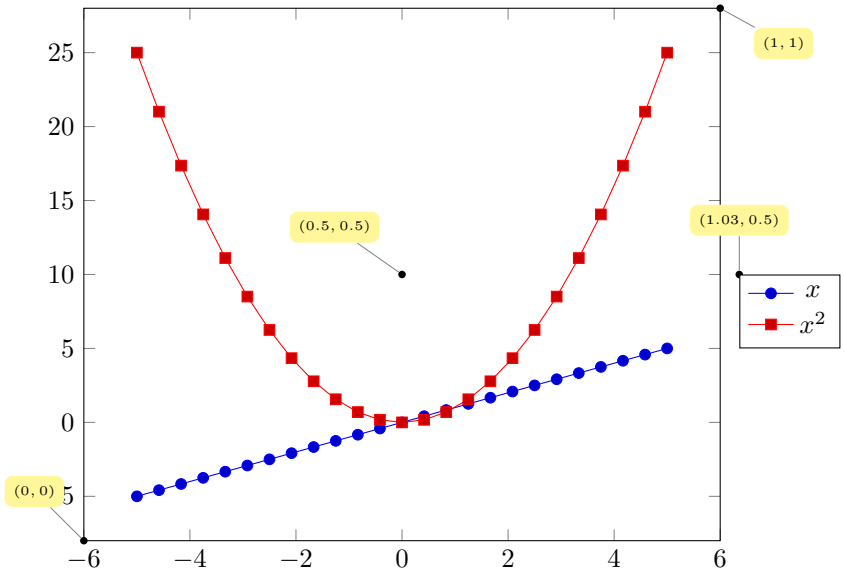

−0.5
0
0.5
1
1.5
2
2.5
−0.5
0
0.5
1
1.5
2
2.5
8
6
4
2
0

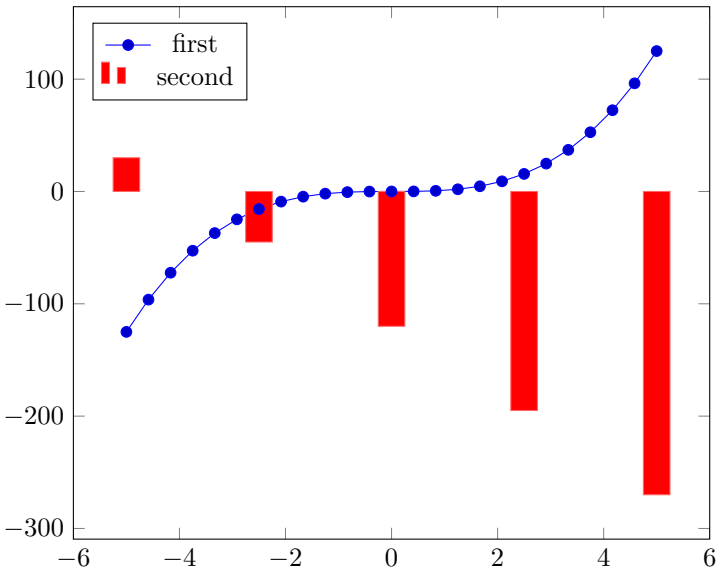

0
1
2
3
4
5
6
7
8
0
1
2
3
−1
0
1
2
3
8
6
4
2
0

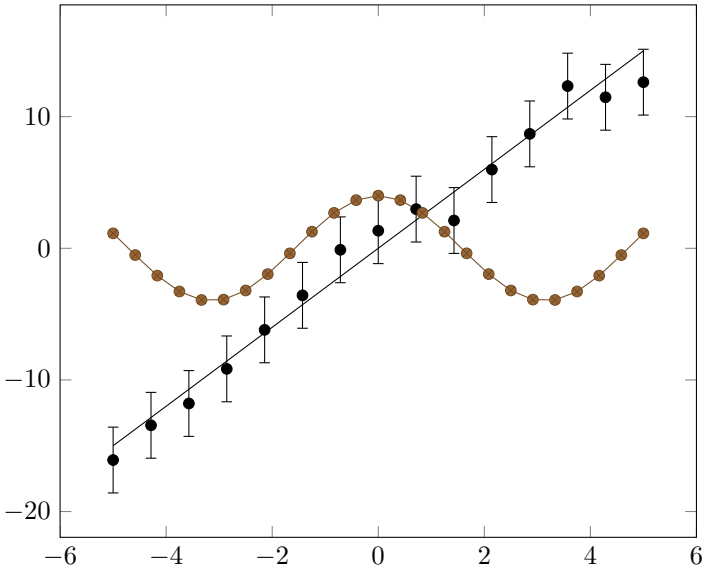
## 1.20 Specialty graphs and settings



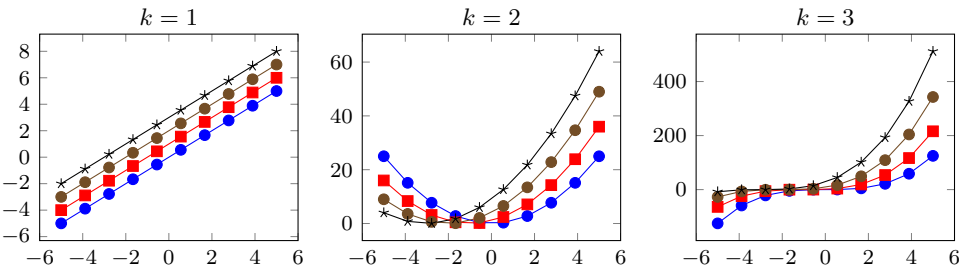

How `axis description cs` works

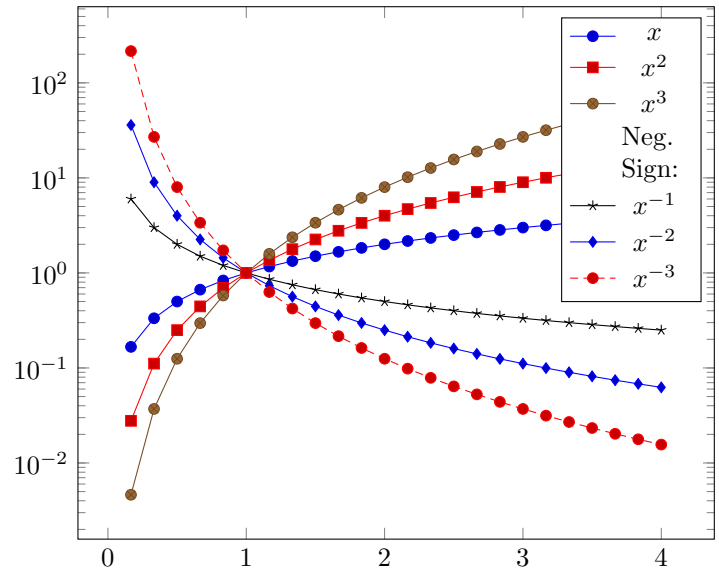


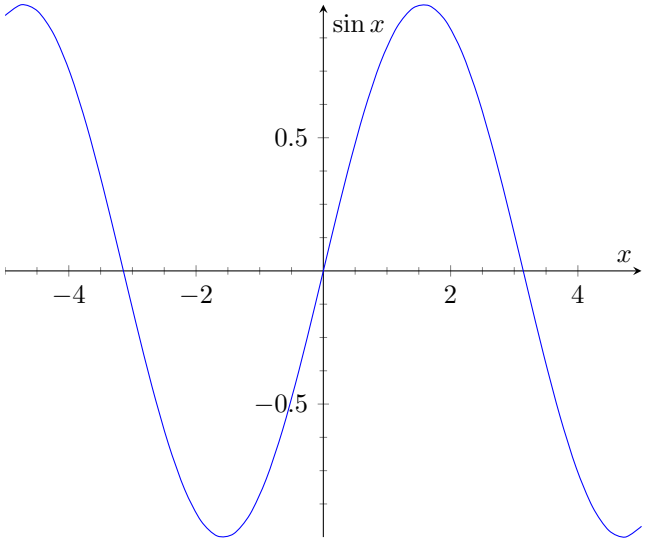


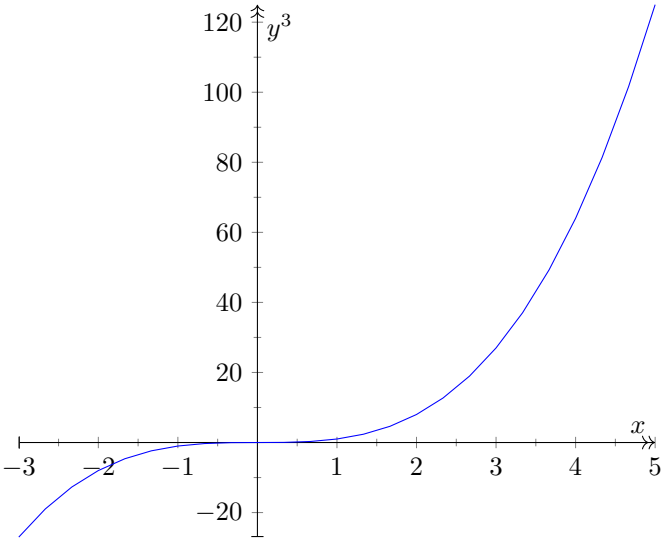



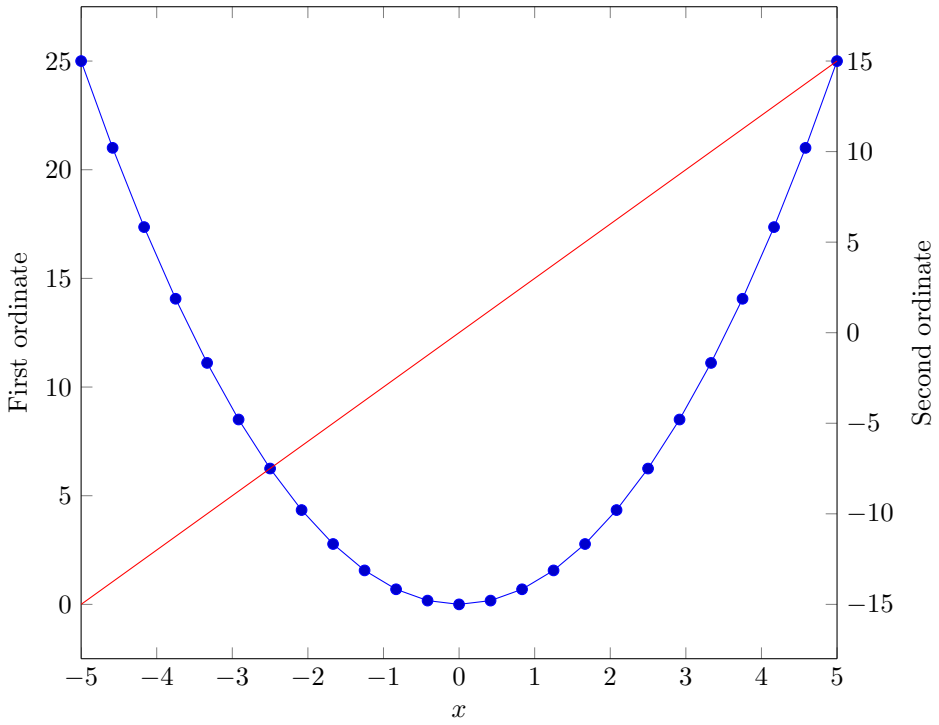

The picture shows the estimations which are subjected to noise. It appears the model fits the data appropriately. Finally, is only here to get three examples.

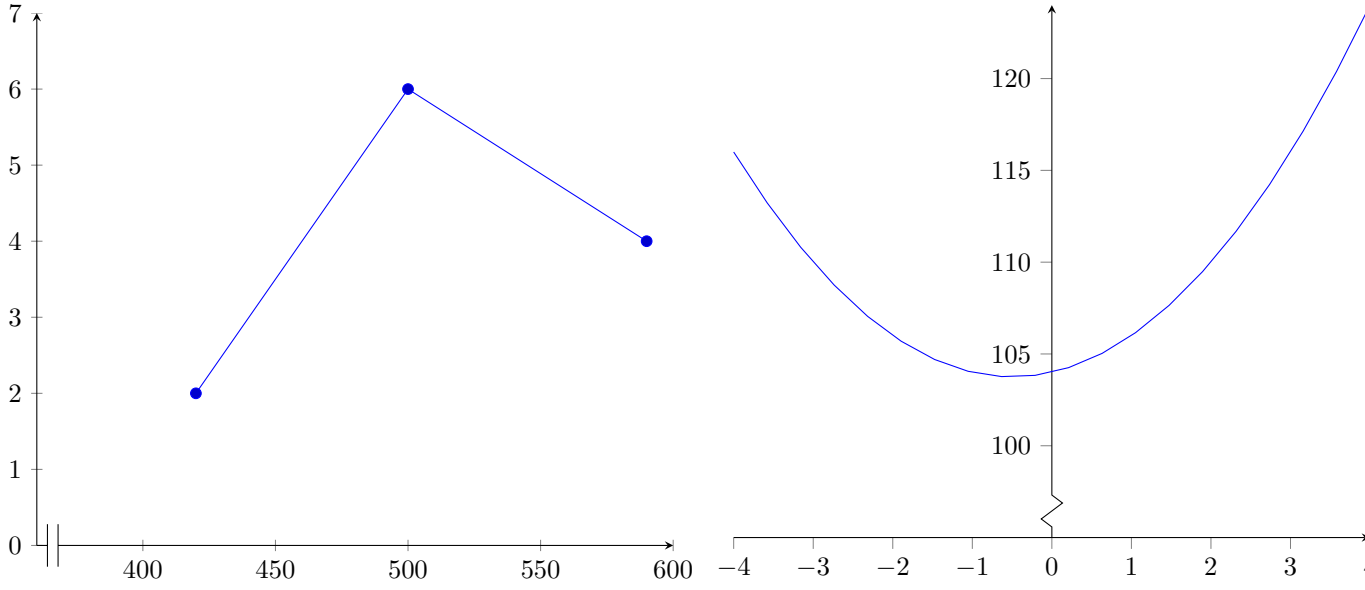


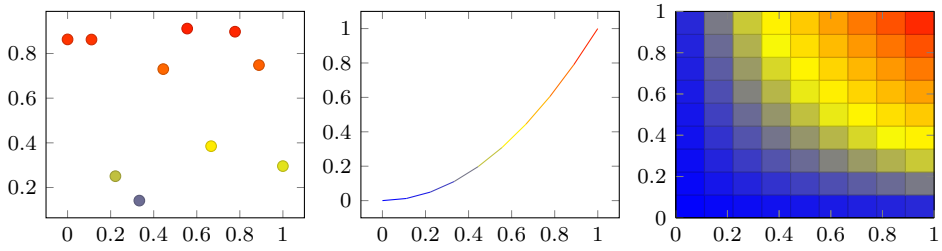

$10^2$
$10^1$
$10^0$
$10^{-1}$
$10^{-2}$
0
1
2
3
4
$x$
$x^2$
$x^3$
Neg.
Sign:
$x^{-1}$
$x^{-2}$
$x^{-3}$

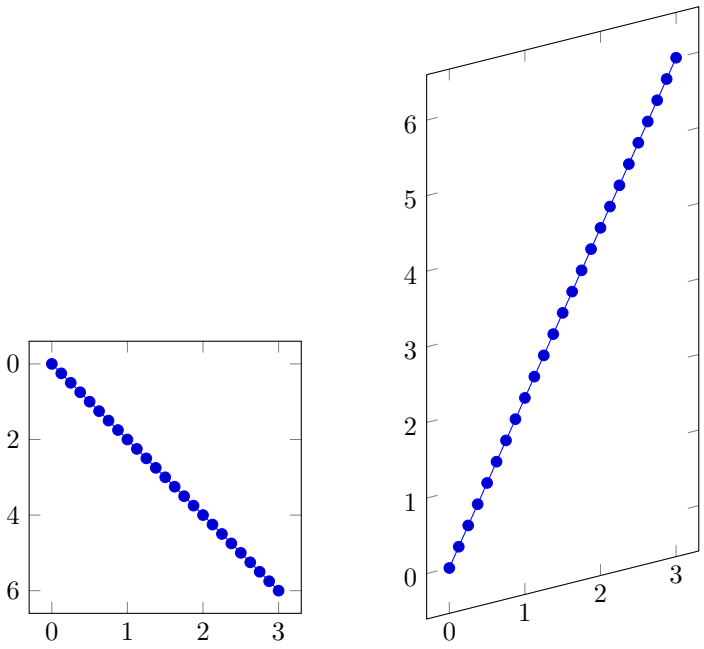

$\sin x$
0.5
$-0.5$
$x$
$-4$
$-2$
2
4


$y^3$
120
100
80
60
40
20
$-20$
$x$
$-3$
$-2$
$-1$
1
2
3
4
5

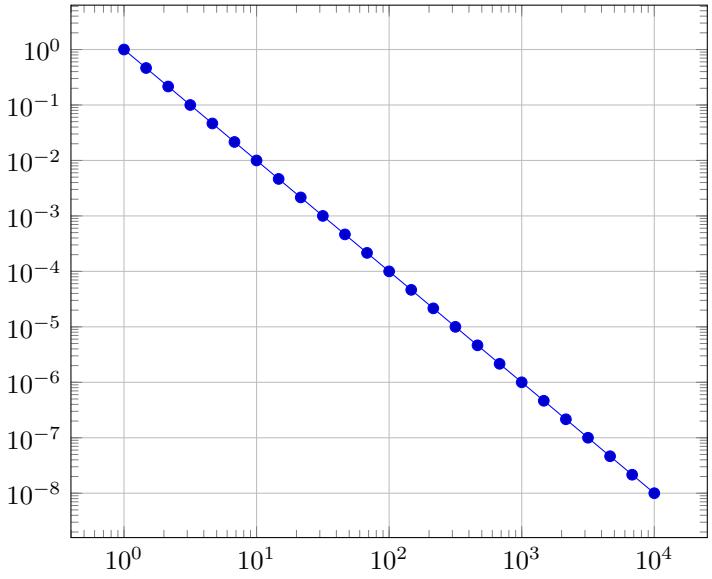

First ordinate
Second ordinate
x



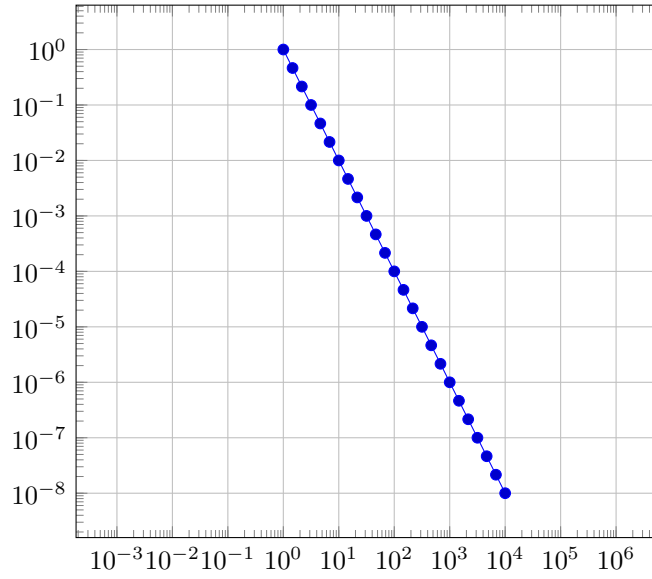




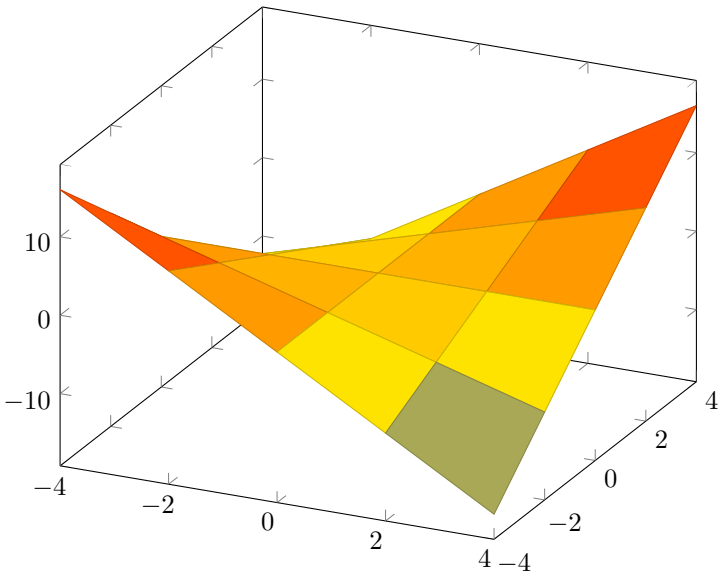

Unequal Axis



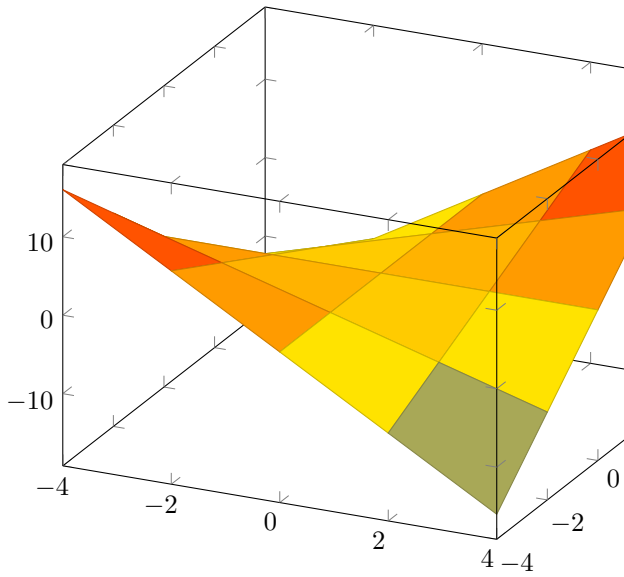

Equal Axis



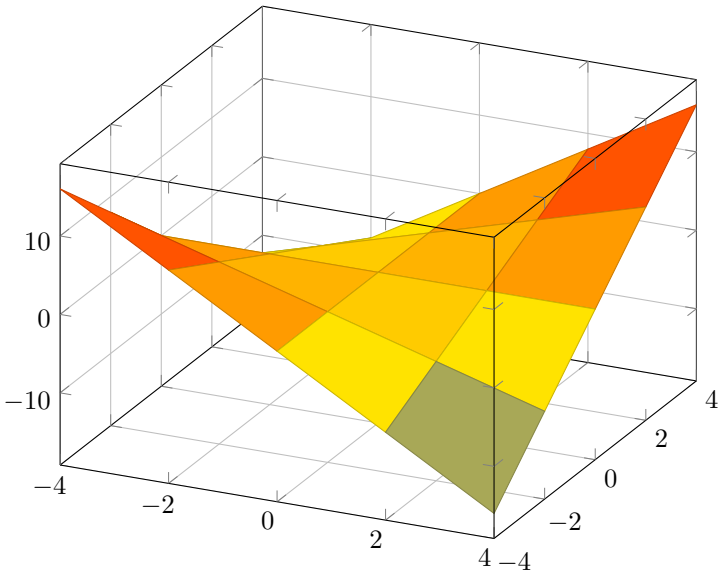
3d box=background



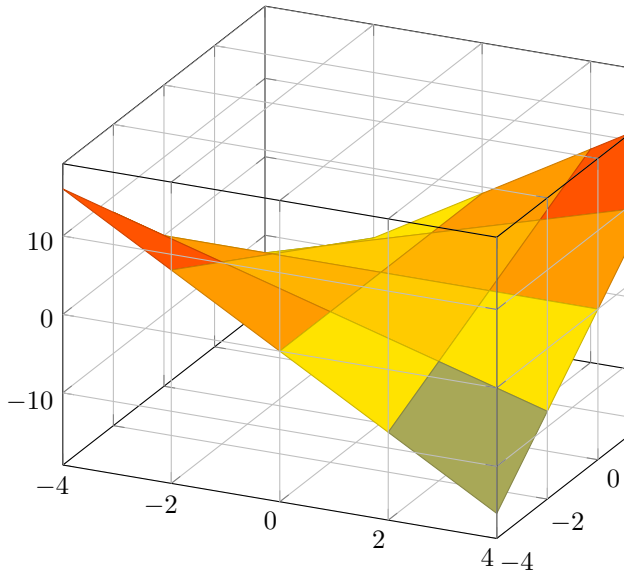

3d box=background

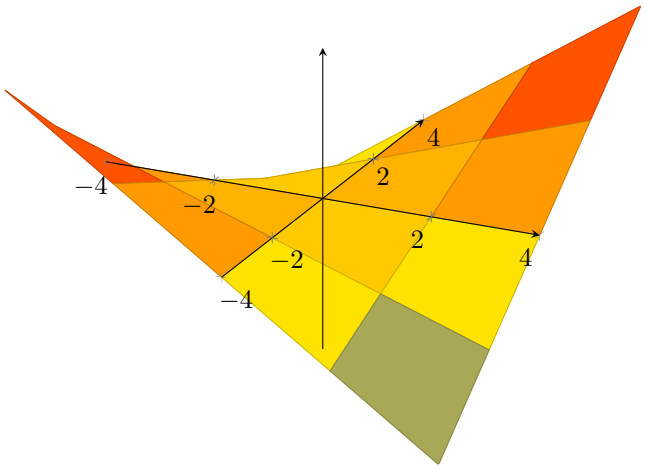


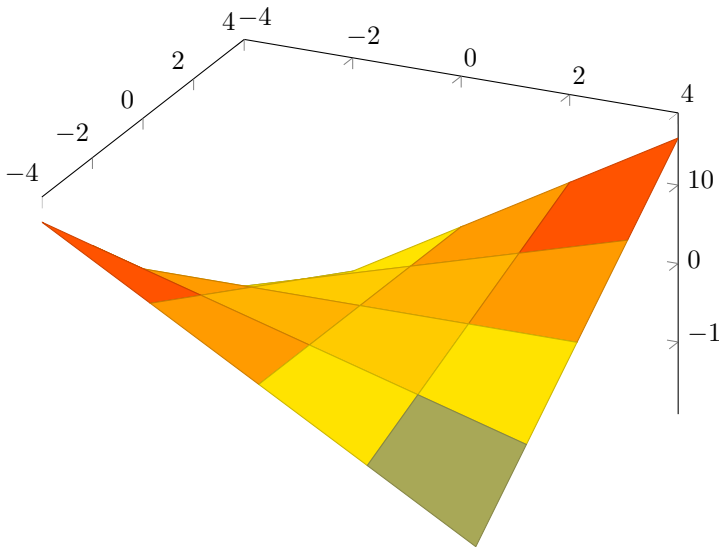

3d box=background

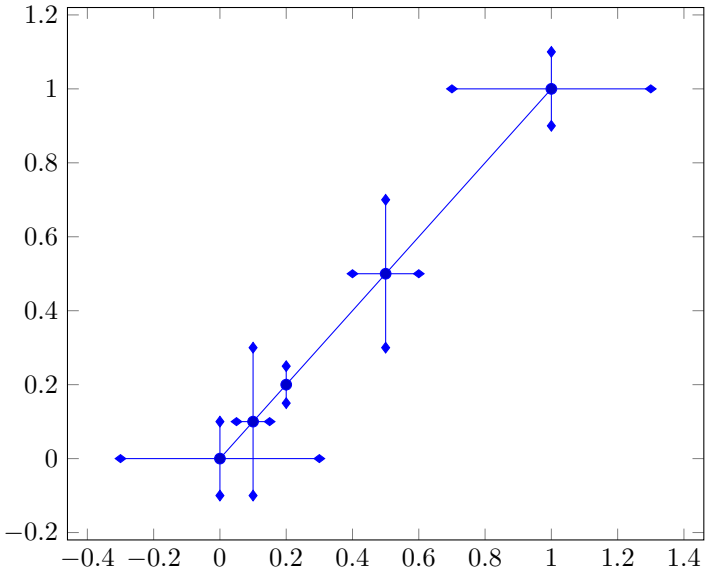


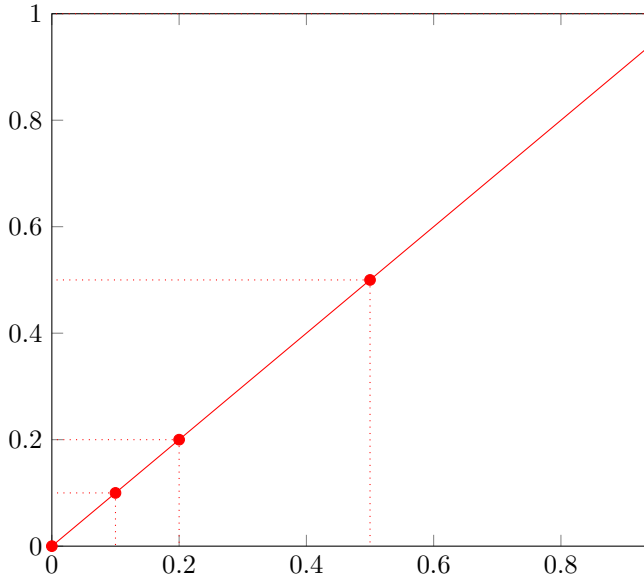

3d box=background

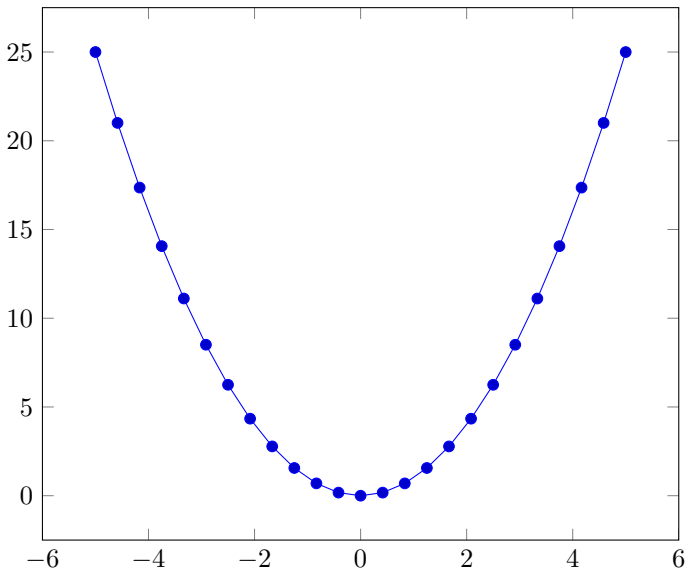


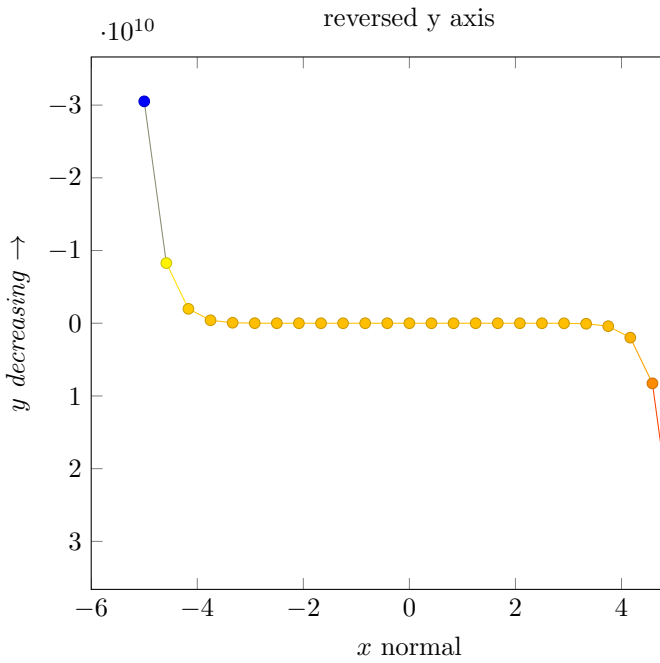

−4
−2
2
4
−4
−2
2
4

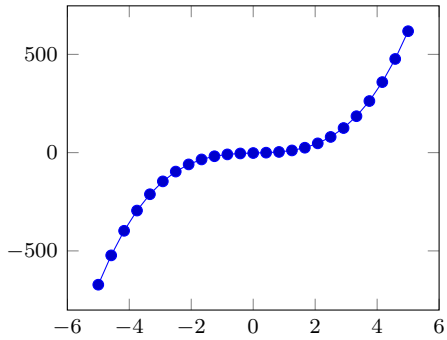

4
2
0
−2
−4
−4
−2
0
2
4
10
0
−1

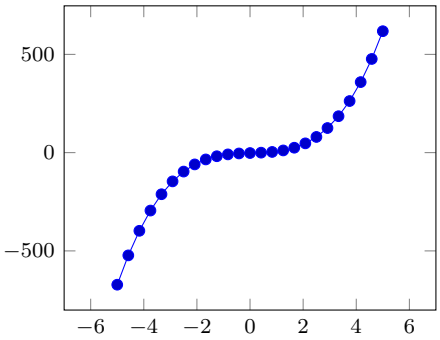

1.2
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4

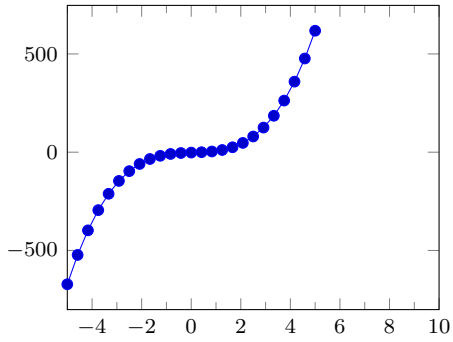

1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8

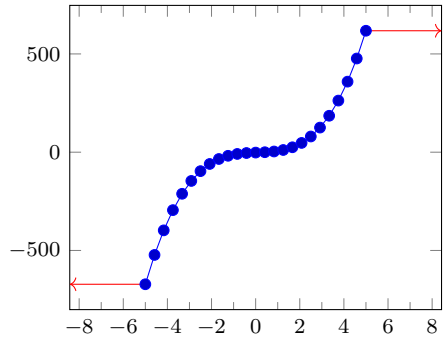

Axis limits are $[-6:6] \times [-2.5:27.5]$
25
20
15
10
5
0
−6
−4
−2
0
2
4
6

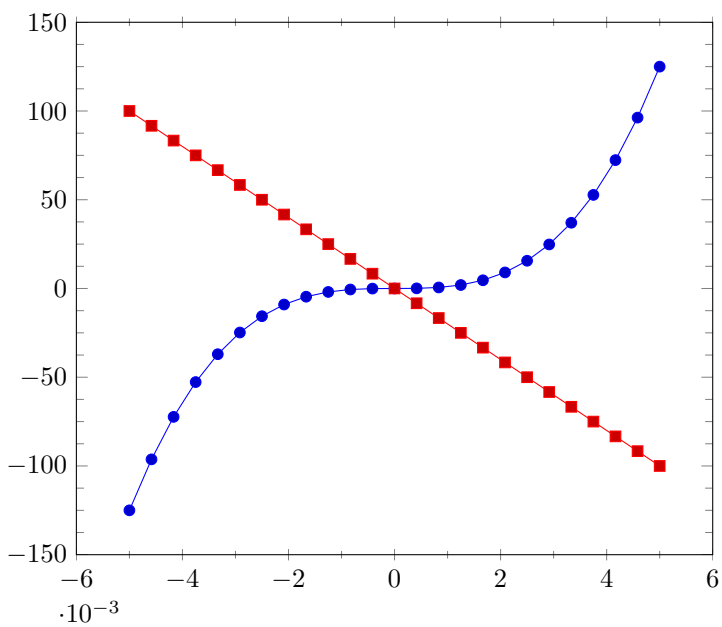

reversed y axis
$\cdot 10^{10}$
−3
−2
−1
0
1
2
3
$y$ decreasing →
−6
−4
−2
0
2
4
$x$ normal

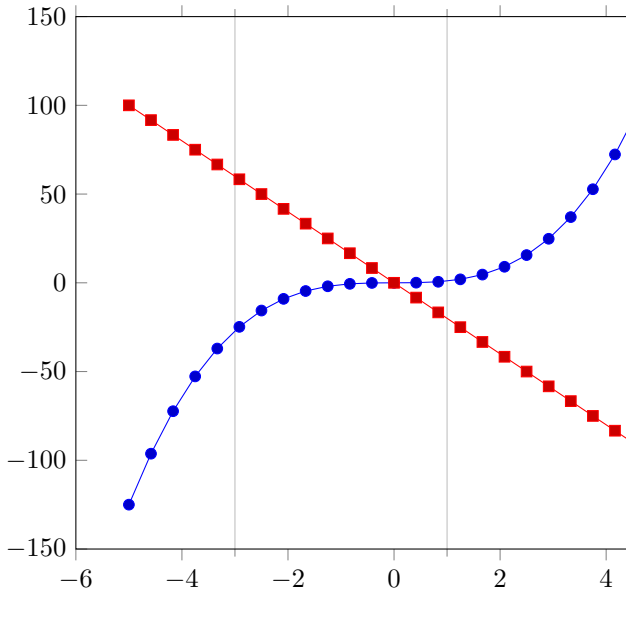

500
0
−500
−6
−4
−2
0
2
4
6

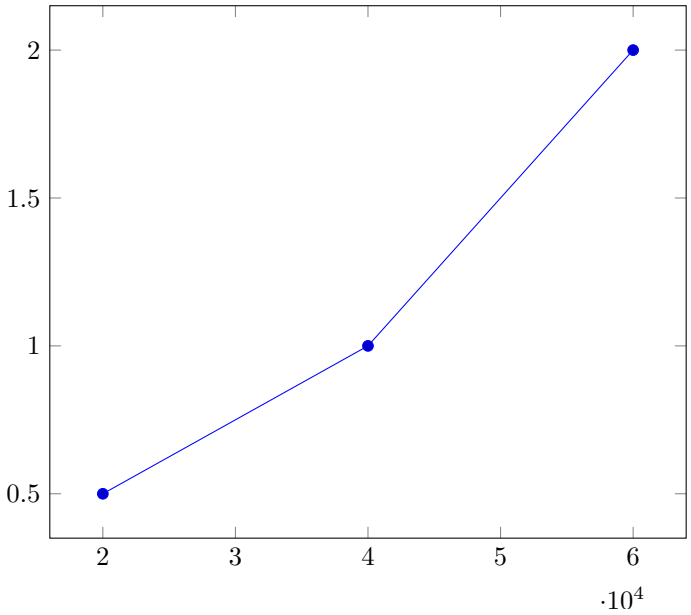

500
0
−500
−6
−4
−2
0
2
4
6

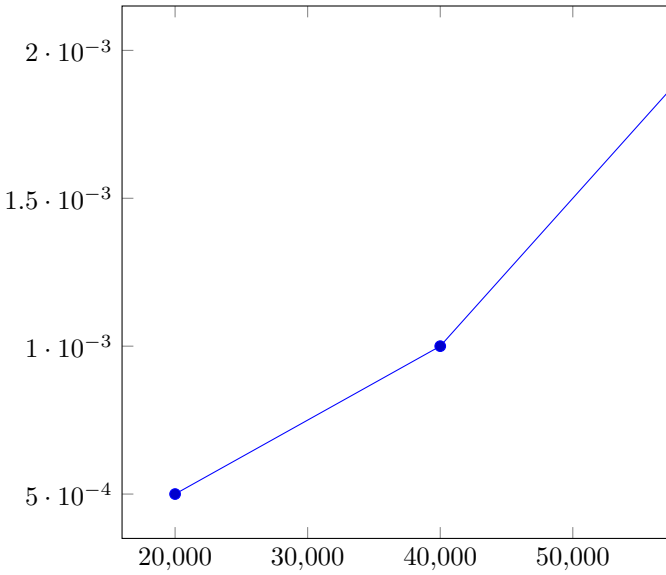

500
0
−500
−4
−2
0
2
4
6
8
10

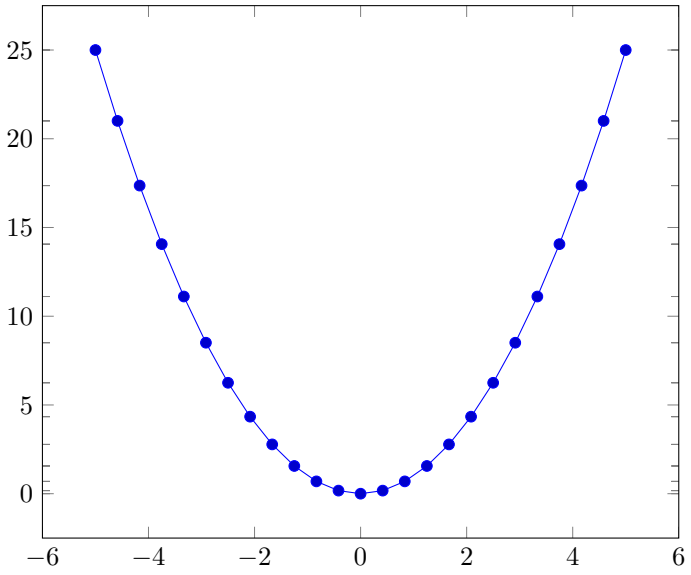

500
0
−500
−8
−6
−4
−2
0
2
4
6
8

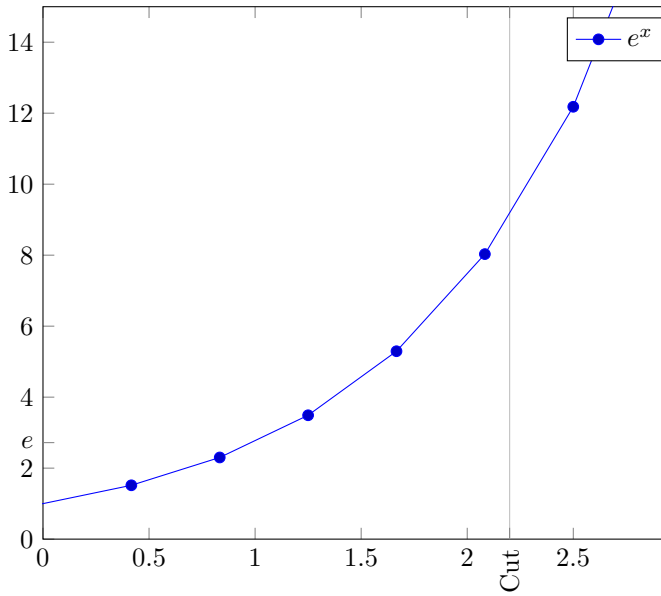

150
100
50
0
−50
−100
−150
−6
−4
−2
0
2
4
6
$\cdot 10^{-3}$

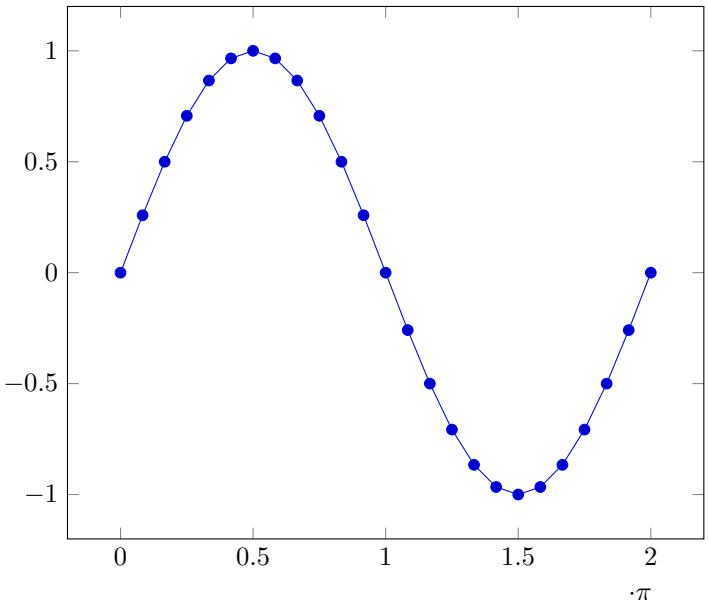

150
100
50
0
−50
−100
−150
−6
−4
−2
0
2
4

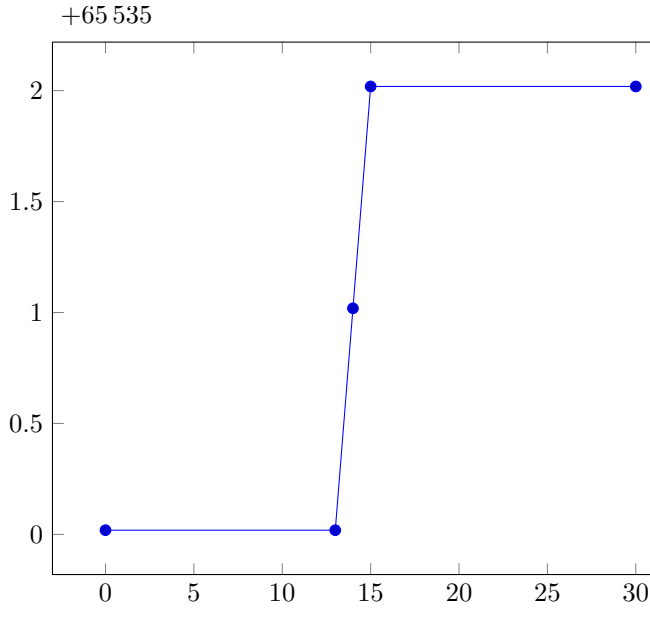

2
1.5
1
0.5
2
3
4
5
6
$\cdot 10^{4}$

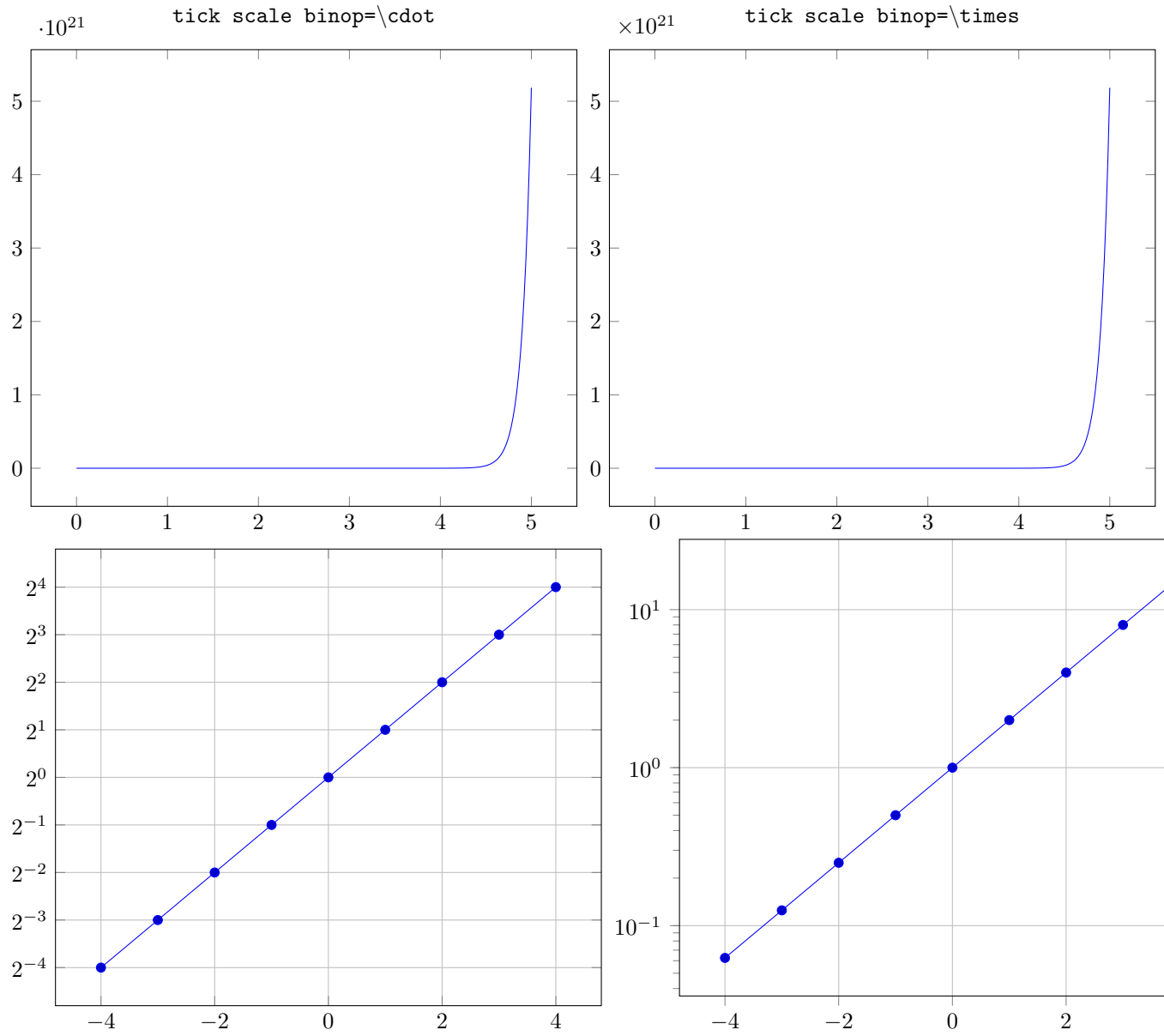

$2 \cdot 10^{-3}$
$1.5 \cdot 10^{-3}$
$1 \cdot 10^{-3}$
$5 \cdot 10^{-4}$
20,000
30,000
40,000
50,000

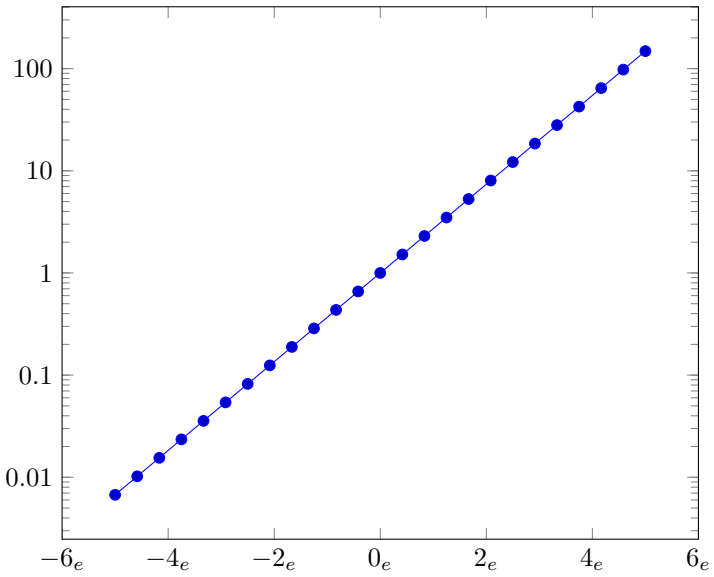

25
20
15
10
5
0
−6
−4
−2
0
2
4
6


$e^x$
14
12
10
8
6
4
e
2
0
0
0.5
1
1.5
2
Cut
2.5

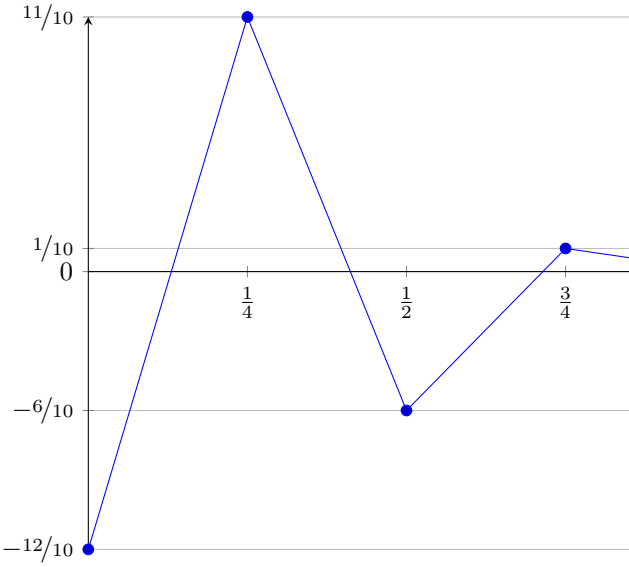

1
0.5
0
−0.5
−1
0
0.5
1
1.5
2
·π

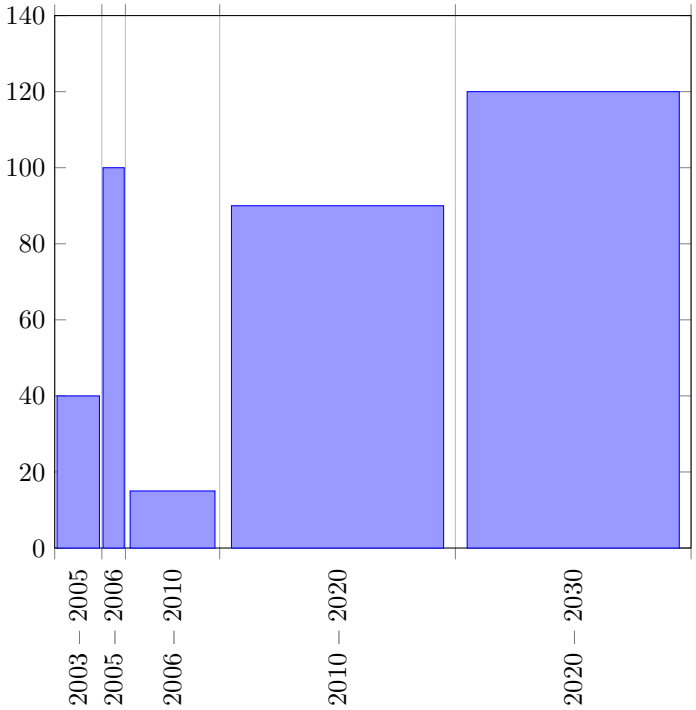

+65 535
2
1.5
1
0.5
0
0
5
10
15
20
25
30

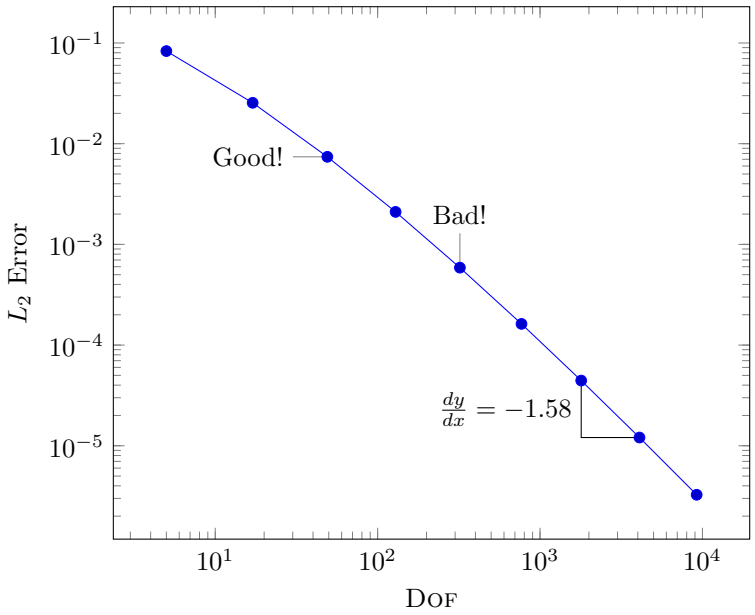

tick scale binop=\cdot
$\cdot 10^{21}$
0
1
2
3
4
5
tick scale binop=\times
$\times 10^{21}$
0
1
2
3
4
5
$2^{4}$
$2^{3}$
$2^{2}$
$2^{1}$
$2^{0}$
$2^{-1}$
$2^{-2}$
$2^{-3}$
$2^{-4}$
−4
−2
0
2
4
$10^{1}$
$10^{0}$
$10^{-1}$
−4
−2
0
2

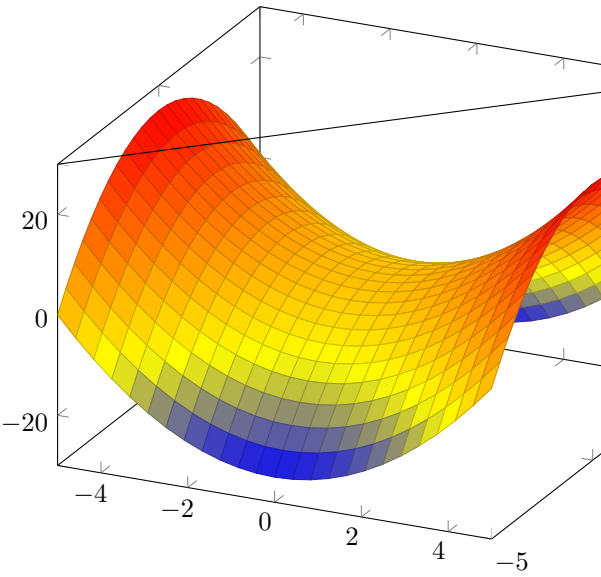



A special Prewavelet

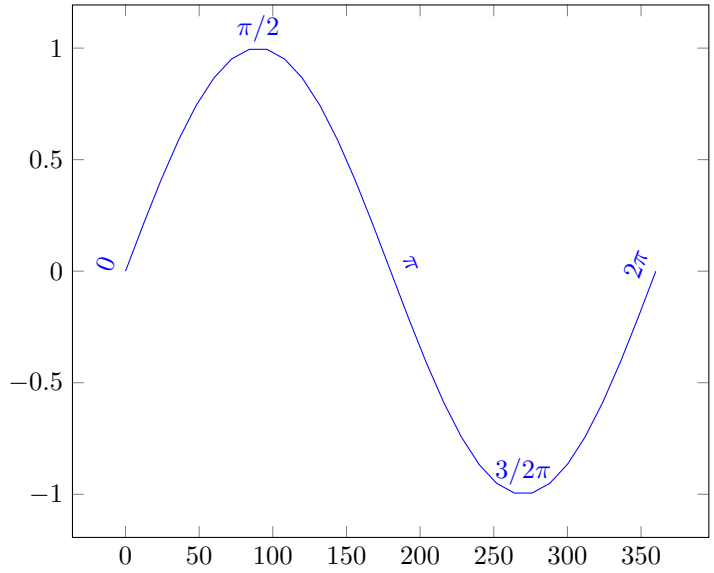


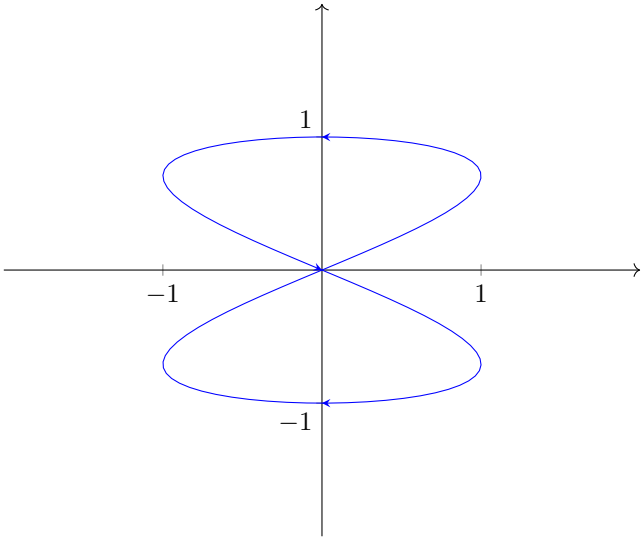





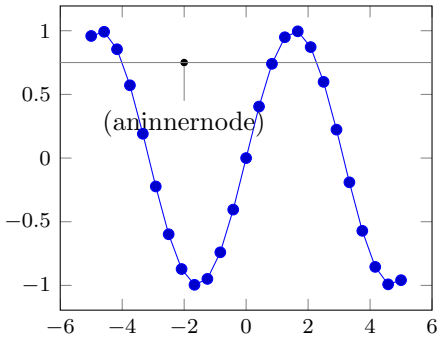




Decorated Graphics

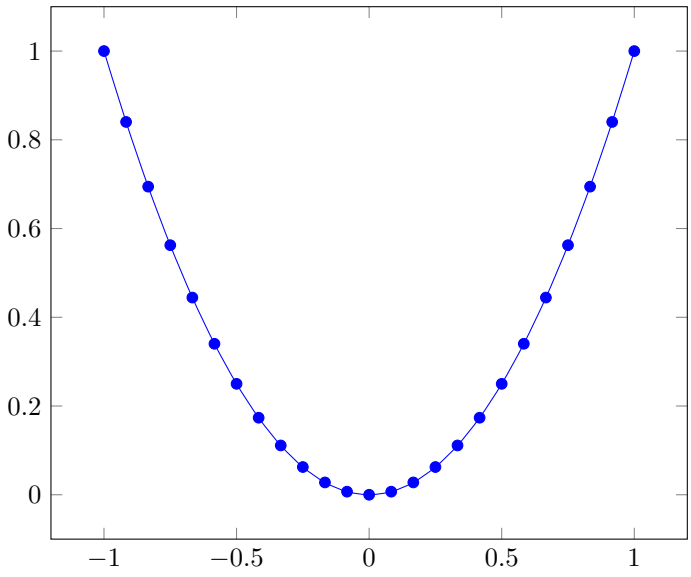


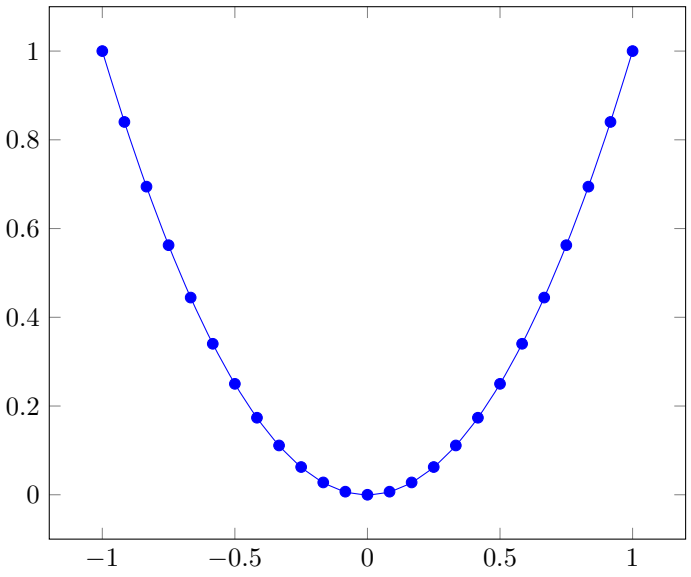

Aligning at .....



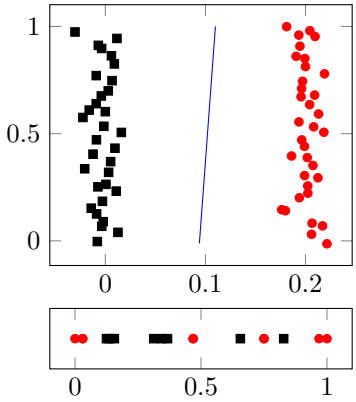

This is a picture, here another one.
Aligning top edge of graphs:

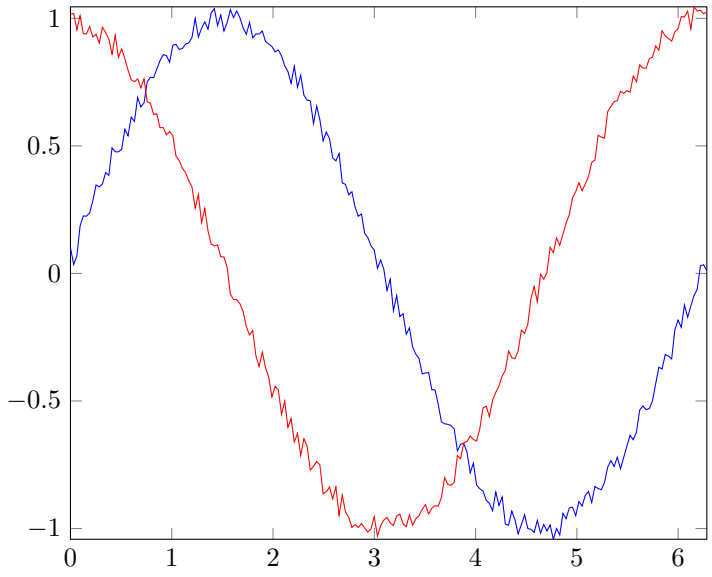


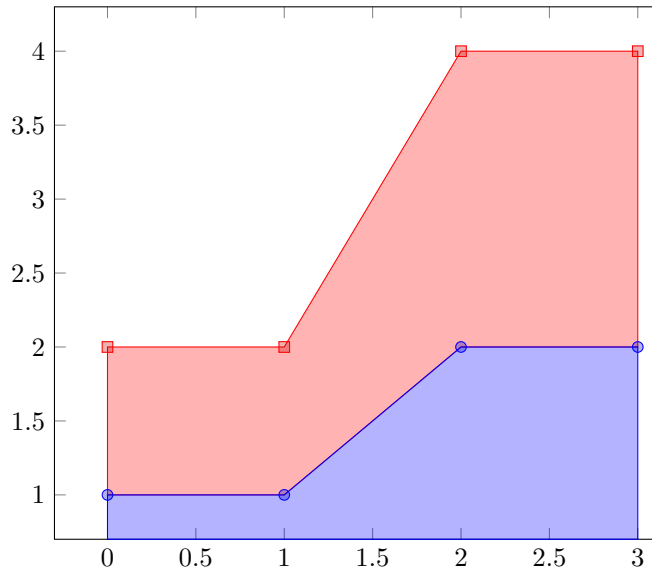

A normal sized $x$ label

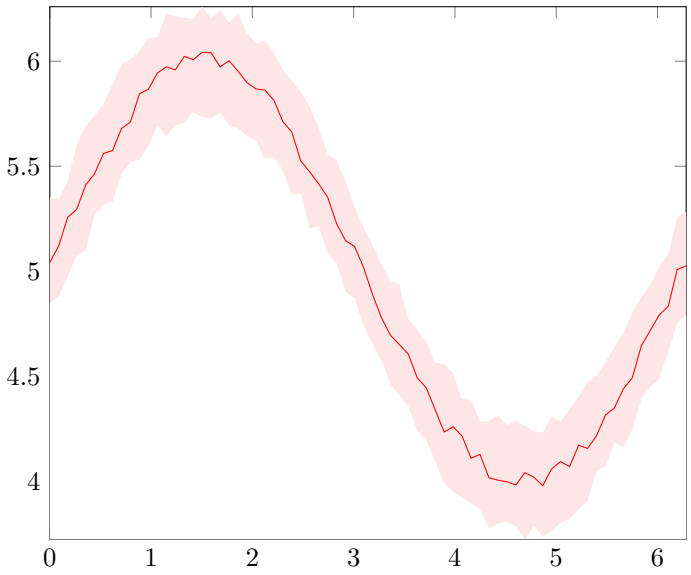


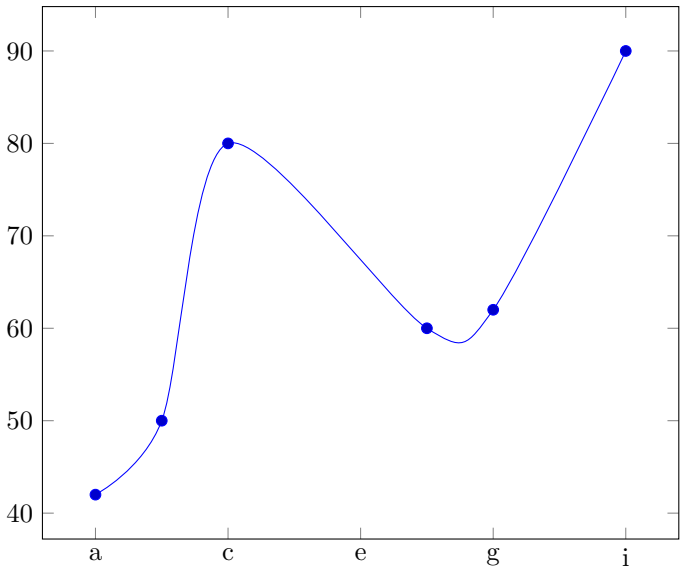

$$\sum_{i=0}^{N} n_i$$

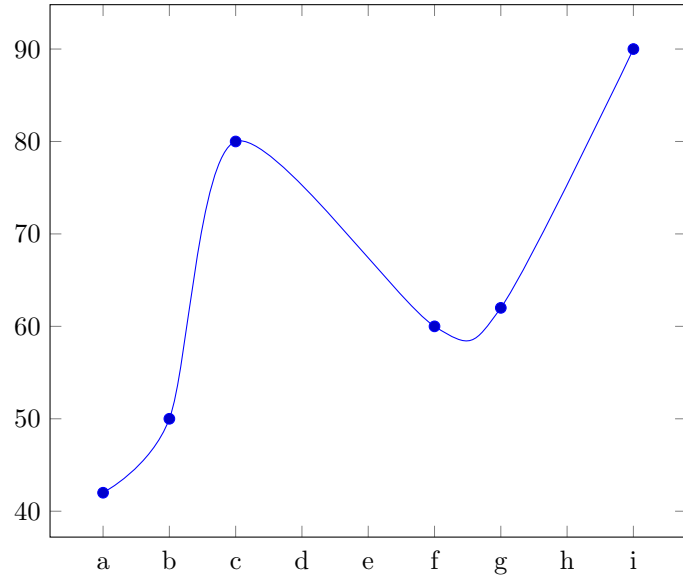


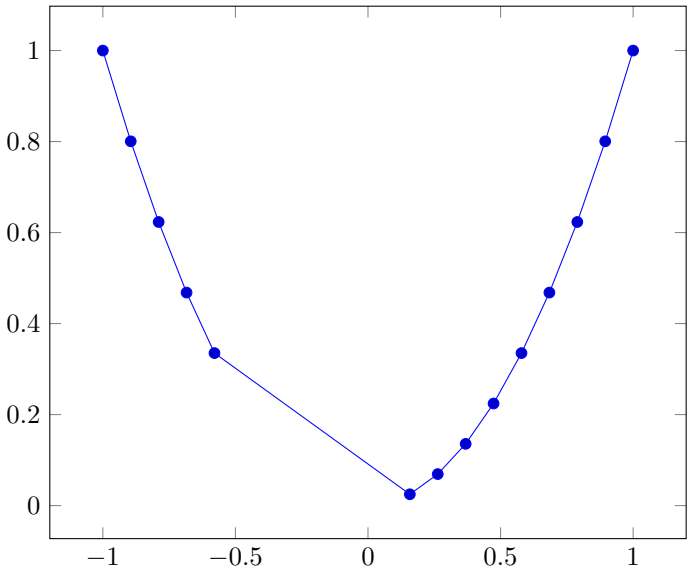



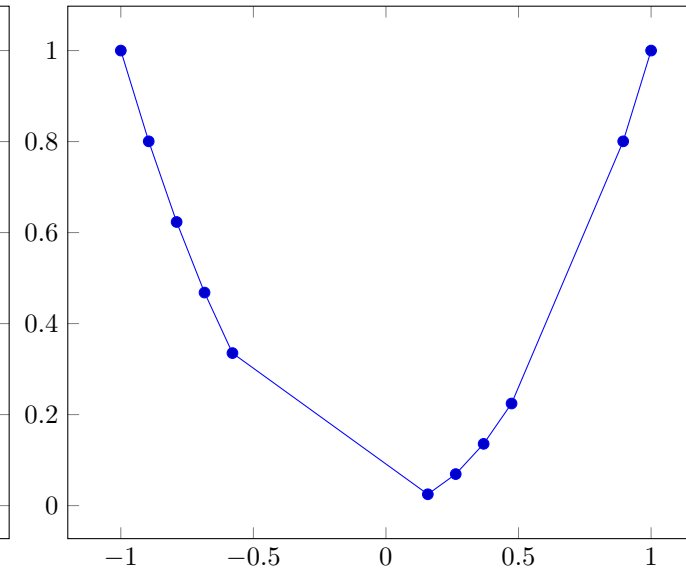



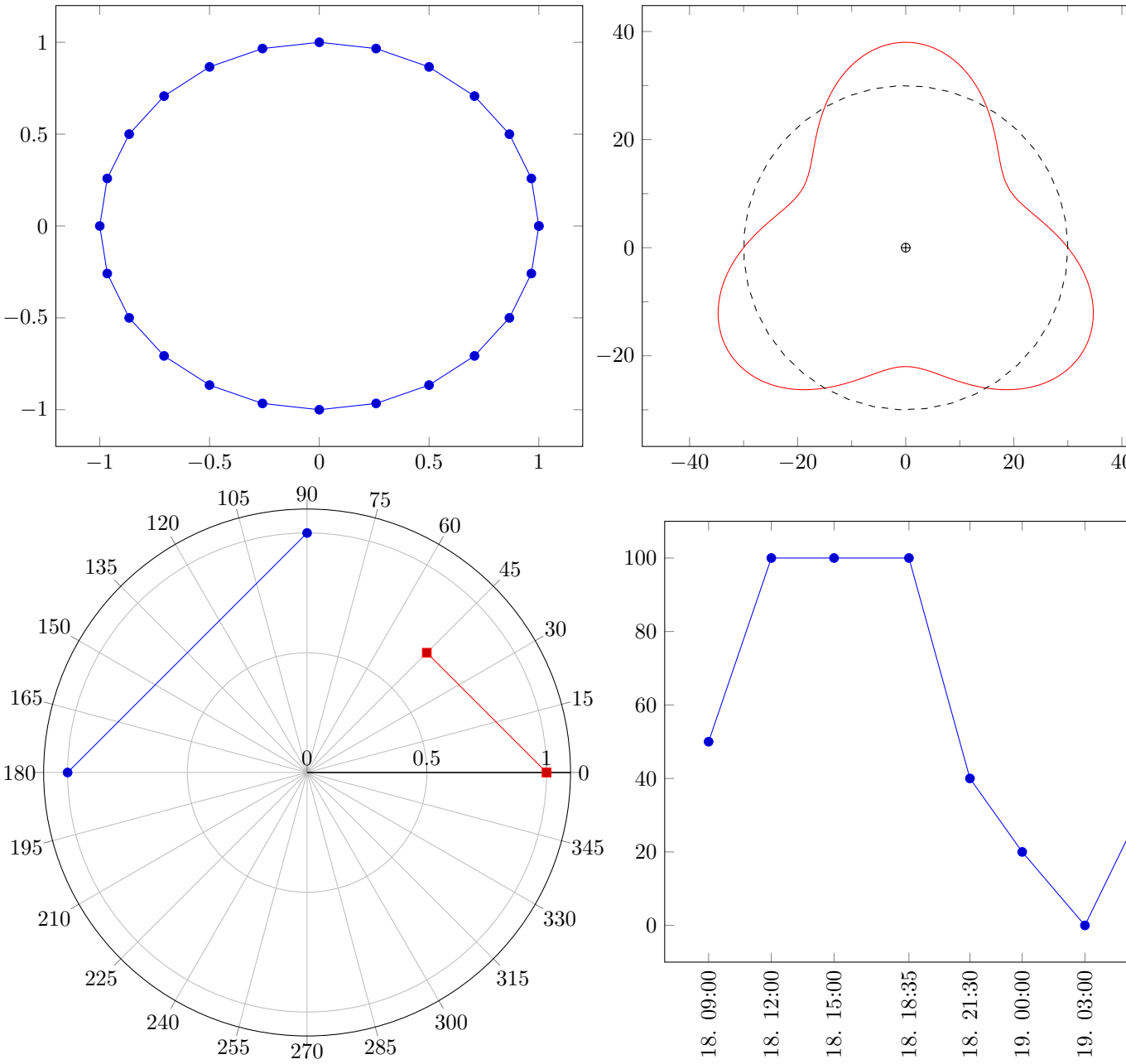

6
5.5
5
4.5
4
0
1
2
3
4
5
6


90
80
70
60
50
40
a
c
e
g
i

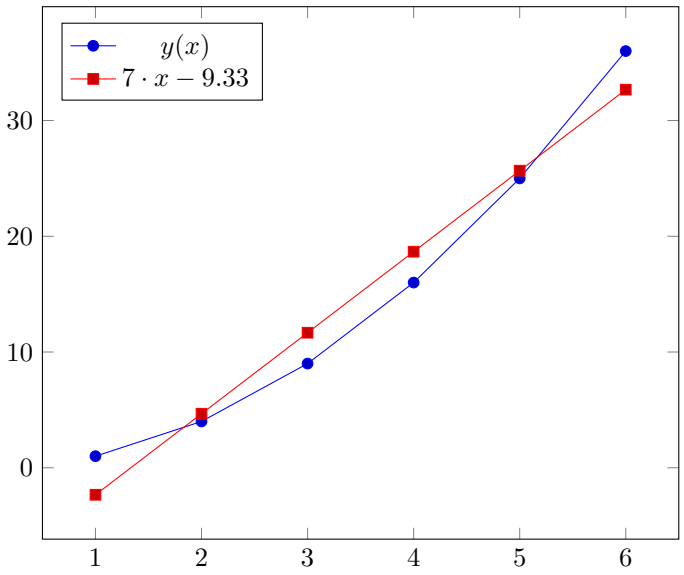

90
80
70
60
50
40
a
b
c
d
e
f
g
h
i

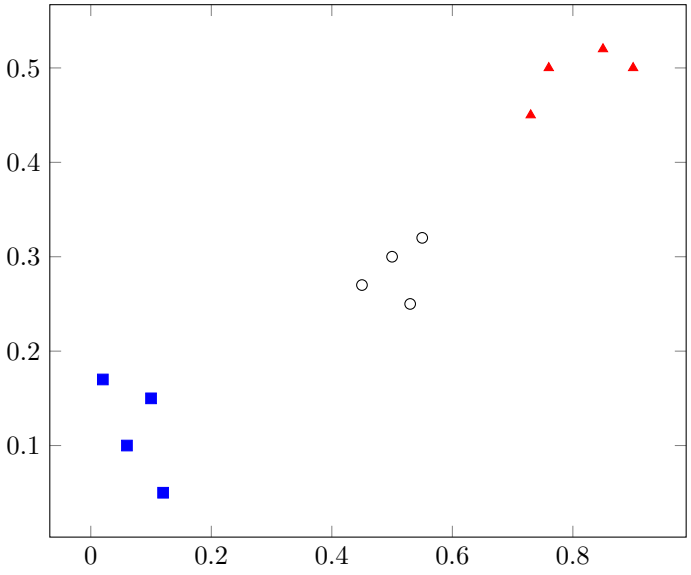

1
0.8
0.6
0.4
0.2
0
−1
−0.5
0
0.5
1


1
0.8
0.6
0.4
0.2
0
−1
−0.5
0
0.5
1




Attention: If you intend to use hours and minutes, you should always provide the date ZERO to maintain adequate precision!


$y(x)$
$7 \cdot x - 9.33$
30
20
10
0
1
2
3
4
5
6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0.3
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0.1
0
0.2
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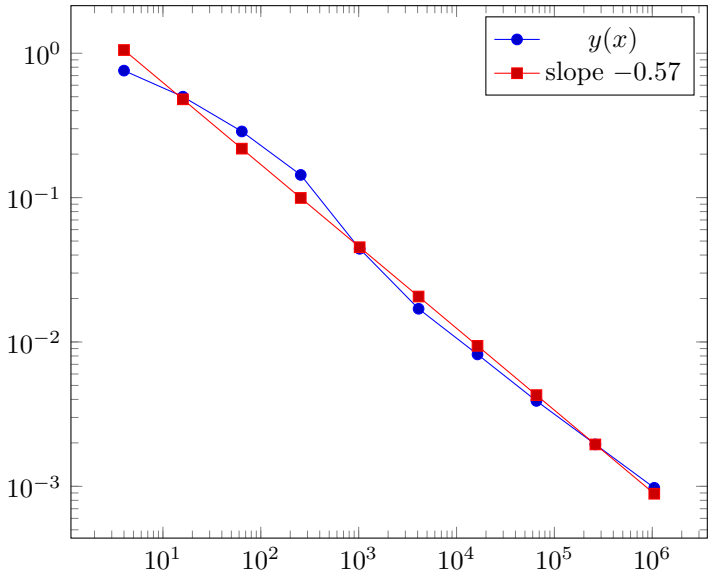
0.6
0.8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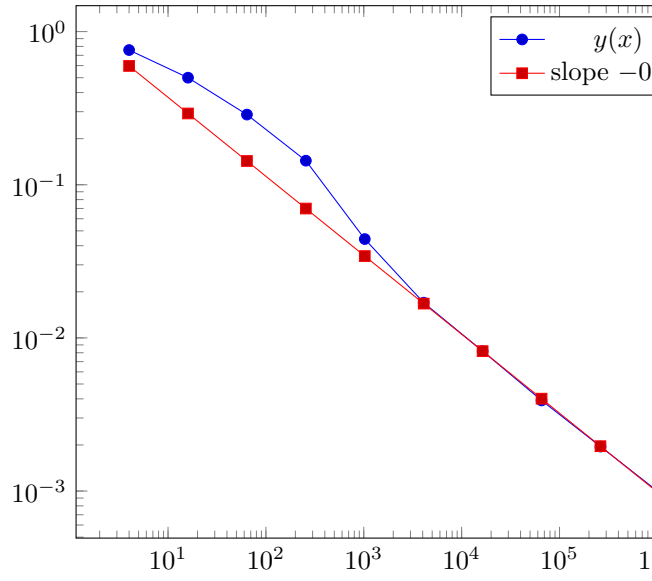
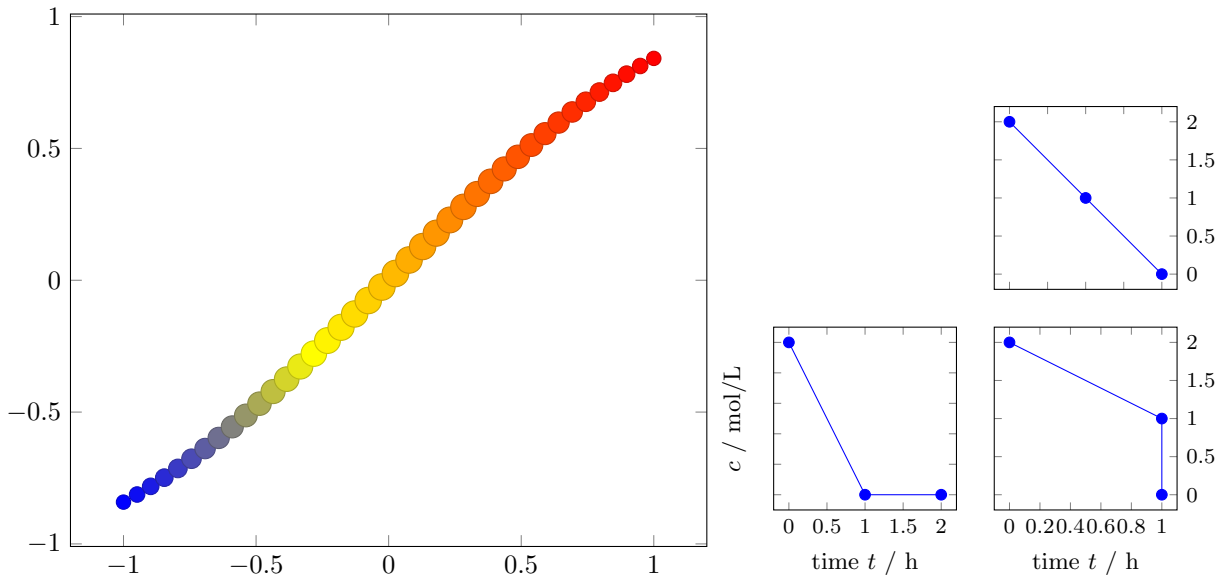
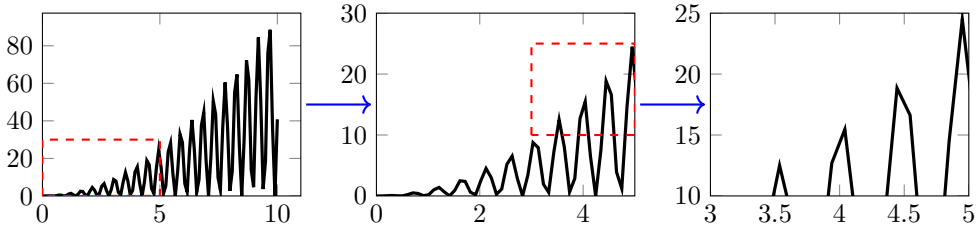
slope $-0.57$
$10^0$
$10^{-1}$
$10^{-2}$
$10^{-3}$
$10^1$
$10^2$
$10^3$
$10^4$
$10^5$
$10^6$


$y(x)$
slope $-0$
$10^0$
$10^{-1}$
$10^{-2}$
$10^{-3}$
$10^1$
$10^2$
$10^3$
$10^4$
$10^5$



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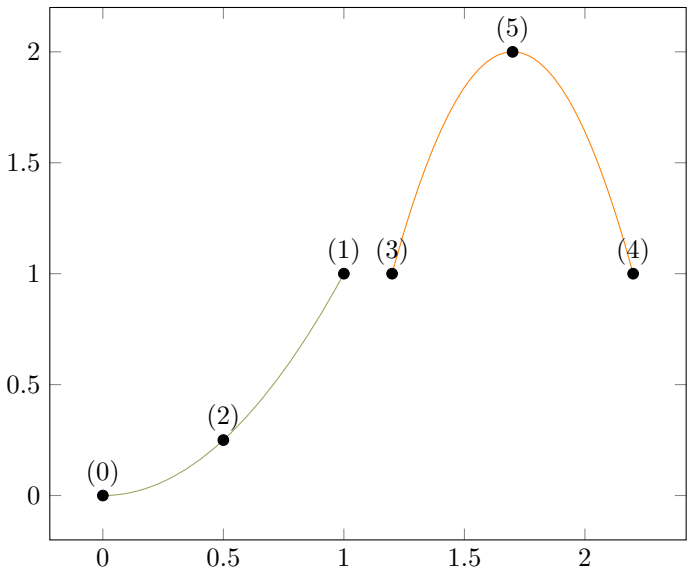
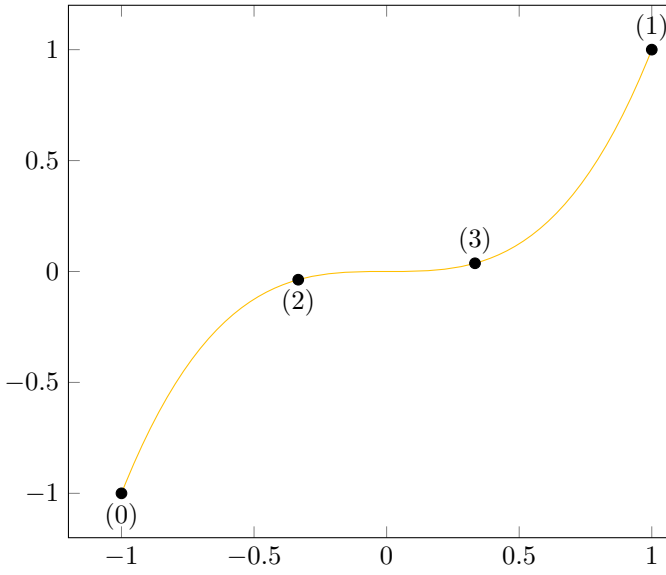
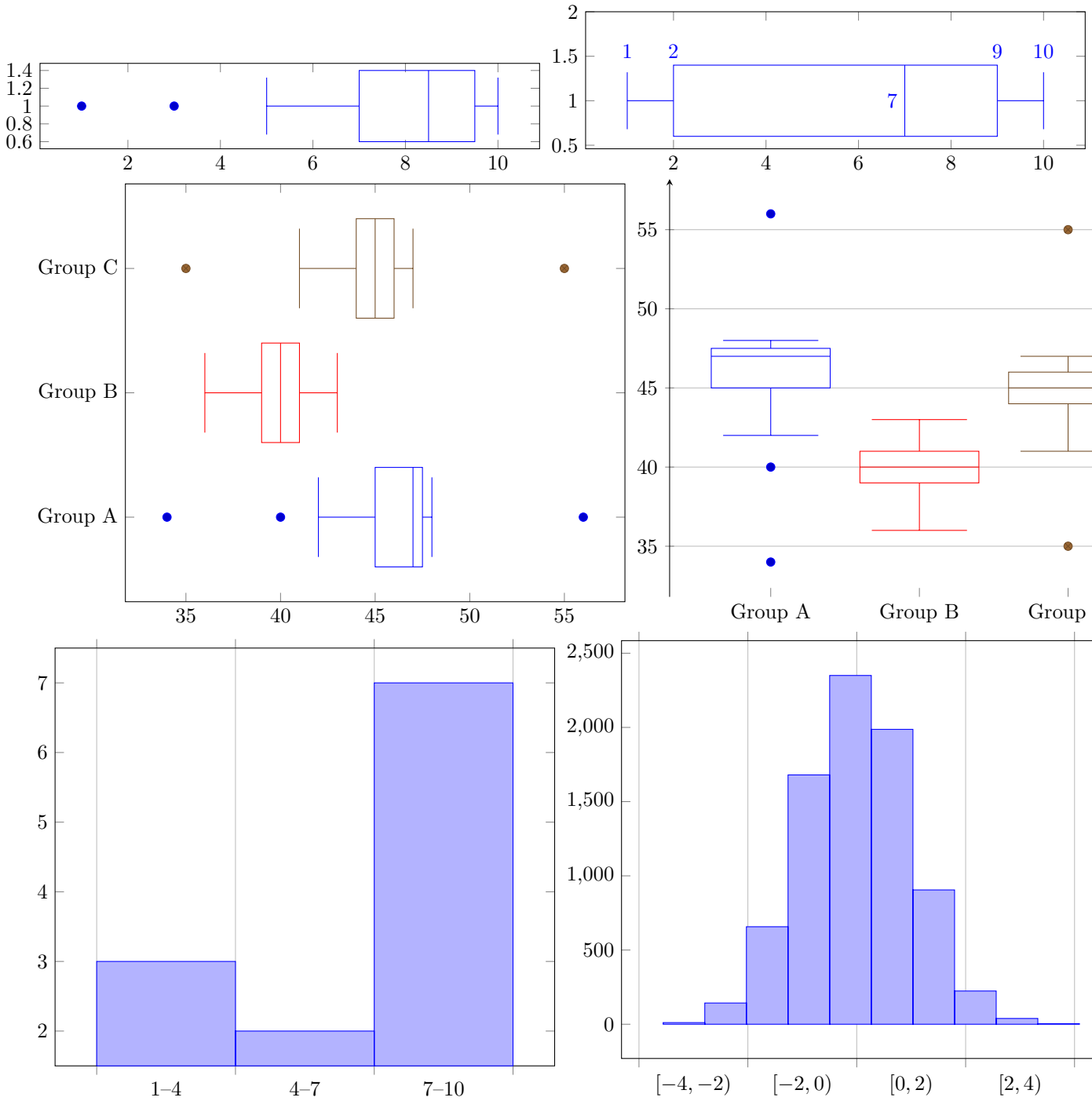
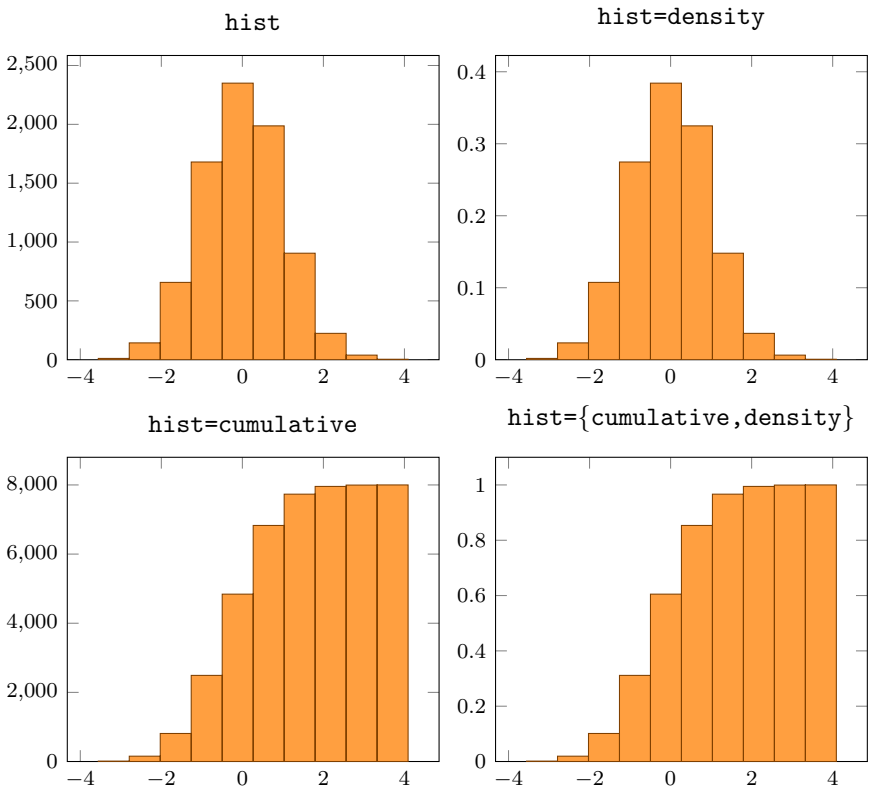
patch type=cubic spline



## 1.21 Statistics

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hist=cumulative
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0.2
0.1
8,000
6,000
4,000
1
0.8
0.6
−4
−2
2
4